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The Journal of Economics 2014-15 is now with you. This journal, which has finally seen the light of the day after a hiatus of one year, is a collective effort of many people.

I owe deep gratitude to Dr M. Pandey, the convener of the Economics Society, who facilitated the working of the Editorial Board and took the initiative to help us in every way he could. Dr D. K. Das was always full of suggestions for the journal and never missed a chance to infuse us with enthusiasm.

The excitement of my board members did not allow a single dull moment to creep in during the execution of this work. I am thankful to Janak Priyani, as it was due to his efforts that the journal was reinstated. I thank Anna Sinha for her fascinating ideas for the journal. Namita Goel deserves a special mention here. Not only was she instrumental in getting the articles from the reluctant first-years, she did all the running to print the manuscripts and every other job that she could have easily disavowed herself of. Shivangi Puri, although a novice herself at designing, put in her best efforts to design a suave format for the journal. I thank her for stepping in towards the end when we were scurrying around in need of a designer and for the wonderful work she did in the little time she had.

It would be remiss on my part to not thank Mohnish Kedia, who, although not a part of the Editorial Board, made up for that which was wanting in the Board. I thank him immensely for his support.

I apologise in case I left out anyone but I convey my gratitude nevertheless.

Thank you!

Editor-in-Chief

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A Note from the Editor

Writing something worthwhile is never easy. It is a messy and delayed affair. It takes time to ideate, followed by several drafts and perpetual revisions. Even after that, the final draft may not be what one wanted in the first place. Academic writing is a particularly complicated subset of this. Disciplines are discourse communities with their own methods of developing and communicating knowledge. Different disciplines inquire from different perspectives and apply distinct stylistic conventions. Thus, academic writing is not something that can be taken for granted by the students or their instructor. It takes time to develop proficiency in it.

I do not just quote my instructors when I assert that the quality of written work produced by college students is rapidly degenerating. In fact, students and instructors alike have accepted with resignation the idea that the average student cannot write well. Academic writing is taken as a chore by the students, as some- thing that cannot be avoided and not as a consequential learning experience. It is considered as something that cannot be learned. As a result, unabashed plagiarism is rampant, which often goes unnoticed by the equally indifferent instructor who works with the assumption that all students are trained in writing before- hand.

William Zinzer, in the introduction to his hugely popular book, *On Writing Well,* explains how the common animosity towards writing is not a cognitive problem, but a cultural problem, which is rooted in the old conventions of (Indian) education. Fear of writing is instilled in students from a very young age, who believe that writing is a special skill that comes only to teachers of English and a handful of students who are blessed with the gift of words. However, unlike the gift of poetry and music, writing is not something that only some people are born with. If a person thinks with clarity, proper writing follows immediately.

So where does the problem lie? School boards like the CBSE and most state boards do little to inculcate writing skills. Where at all there is any focus on writing, it is on grammar and syntax and less on the *art* of it. While students are taught how to join two sentences with the right word, they barely learn how to write a meaningful paragraph on their own. Language is treated solely as a set of rules rather than as a conscious communication of ideas. The problem worsens when the student goes to college. The instructor proceeds with that assumption that the students are trained in writing. Courses do not try to develop academic writing; they simply require it. Students are left to their own devices and make use of whatever competencies they possess. Therefore, a student does not even get a chance to learn to write before this problem turns into something chronic. As such, it was little surprising for me when I heard some of the first years say that although they wished to contribute to the journal, they did not know how to write!

In this context, studying Economics as a discipline has an added disadvantage. Of the six semesters, the first three hardly offer any course that requires contextual analysis or written work. Thus, after almost half the coursework is completed, the students get the first (dis)taste of what is fondly known as a *theoretical paper*, which is taken with utmost weariness and liability. Once, I got a chance to look at a feedback form of the Economic History class, which, with great conviction, read, 'it is the most useless subject and should be removed from the University curriculum'. Indeed, such is the antipathy towards any course involving written work.

I like to believe that this journal, in its own way, is an attempt to bring students to a common dais to learn writing, however small the group we may have catered to. Our grand plan of organising a writing workshop may not have materialised this year as the board was constituted later in the year and most of our time and efforts had to be directed towards resolving the teething problems that any new enterprise faces. I hope the next Editorial Board executes this plan and, in fact, goes a step further towards changing the ingrained attitudes towards written work.

Meanwhile in the digital world, writing has been reduced to one hundred and forty characters by the social media. In this situation, launching our journal online becomes a symbolic protestation against this decay in writing habits that reflects clearly amongst college students.

Lastly, like Capote, we at the Board *believe more in the scissors than we do in the pencil*. We have tried to ensure that the pieces published in this edition are crisp and concise so that the readers do not get surfeited by them. We hope that the readers find this journal insightful and enriching enough to ardently await its next edition!

Mridul Joshi
Editor-in-Chief

Economics of Climate Change

Namita Goel, Associate Editor and representative of the first year students in the Board, writes on the economic impact of environment destruction and the Kyoto Protocol.

The greenhouse effect is a hot topic, both literally and figuratively. It is widely acknowledged that human induced climate change is real, though, uncertain in its details. Climate change is likely to have different effects on different sectors. Economic activities that have excessive interactions with the unmanaged environment such as agriculture, forestry and coastal activities are likely to be severely affected by climate change. Agriculture and other primary sectors serve as livelihoods of more than 30 percent of the population in many developing countries. This is why climate change has a greater impact in developing countries. Moreover with fewer resources at their disposal, climate change makes developing countries more vulnerable, thus, amounting to a double tragedy.

With the increase in the emission of carbon dioxide and other greenhouse gases, the temperature of the earth is rising and many ice capped mountains and glaciers are melting. The sustainability and food security is also increasingly hampered with climate change that impacts the agriculture in two ways. It diminishes the ability of the ecosystem to provide food. Second, a shift in agricultural regions may encroach upon natural habitat. The rainfall and temperature is affected, which has a direct impact on the crop yield. As the temperature rises, the crop duration shortens, thereby decreasing growth and yield of crops. Moreover, insects are able to complete a greater number of reproductive cycles causing greater infestation during crop season. The largest numbers of persons who are affected by this problem live in South Asia, which has roughly 300 million undernourished people.

Climate change is an externality that is global in both its causes and consequences. The incremental impact of a ton of greenhouse gases on climate change is independent of where in the world it is emitted, because local climatic changes depend on the global climate system. This human induced climate change caused by emission of GHGs (greenhouse gases) is an externality which can be corrected only if policy intervention is directed to this sector.

One such policy that was adopted was the Kyoto Protocol. It was adopted on 11 December, 1997 in Kyoto, Japan and entered into force on 16 February, 2005. There are currently 192 signatories to Kyoto Protocol who commit to reduce GHG emissions realizing that global warming is nothing but a real phenomenon devastating the earth and that the chief reason for it to happen is manmade carbon dioxide emissions.

The Kyoto Protocol worked on two major elements. First, it held developed countries responsible for the incessant increase in GHG emissions and imposed binding emission reduction commitments on them. Second, Kyoto Protocol developed a market mechanism based on the trade of GHG emissions permits that worked in a flexible manner. Kyoto Protocol allowed the countries to meet their emission targets domestically (onshore emission reduction) as well as internationally, which was through these *market based emissions* and allowed countries exceeding their emission targets to buy *credits* by engaging in trade with other Kyoto Protocol countries who are able to achieve their GHG reduction targets. It is among the most comprehensive and rigorous systems of compliance for a multilateral environmental agreement.

Another world body that works towards assessing the climate change is the Intergovernmental Panel on Climate Change (IPCC). It was established in 1988. It is an undertaking of the United Nations General Assembly and provides regular assessments of the scientific basis of the climate change, its risk and impacts to policymakers. IPCC does not conduct its own research but analyses the papers published during that year to give an overview to the policymakers about the climate change. IPCC reports are published by hundreds of scientists chosen from diverse regions who work as volunteers towards the issue. The report does not impose any binding targets on governments but policy pursuits that can be chosen by them. IPCC completed its fifth assessment report in November 2014. In its fifth report it pointed out the importance of national and sub national plans as national governments play a key role in adaptation and implementation through coor-

dinating actions and framework for support.

Some countries decided to back out from these protocols considering them as a huge *economy wrecker.* It is, in fact, high time that countries realize that not taking preventive measures and not being a part of any environment protection agreement would be the real economy wrecker in the long run.

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The Hidden Relevance

Janak Priyani, Associate Editor and the representative of the third year students in the Board, writes on the Economics of Sports.

With the Cricket World Cup just over and the fever of Indian Premier League about to set in some days, this is an apt time to write about something that I would like to call the Economics of Sports. Why is Cricket in India more popular than Hockey, or any other sport for that matter? Simply put, it is popular because it is popular!

Since Cricket is popular i.e. majority of the consumers prefer a cricket game to a game of any other sport as a source of entertainment, it gathers a large audience that earns a huge revenue for the Board of Control for Cricket in India (BCCI) in terms of broadcasting rights, media rights, franchisee rights from IPL and sponsorships that turn into higher resources for the cricket body to spend on hiring players and other facilities to maximize its profit. This feeds back into better performance of the Cricket team and a higher proportion of the younger generation being interested in cricket, generating more talent for the Indian team and feeding the popularity of the game amongst the populace. The argument for hockey being less popular follows on the same lines.

Looking at every sports body as an enterprise involved in providing entertainment, and of course, maximizing their utility, the argument would not sound far-fetched. The enterprise seeks the specialised skills of the players to achieve its objective. Every player is a utility maximizing agent, where utility is a function of both monetary and non-monetary factors. In sports, the players are faced with only one buyer for their services at the national level, which is the governing body of that particular sport, wherein certain types of contracts prevail defining the pay scale and tenure of contract along with certain other conditions. Lack of competition tends to depress the earnings of players below their actual market value. The contractual pay of cricketers is much higher than other sportspersons. Cricket has, no doubt, got a first mover advantage in terms of commercializing the sport.

Tournaments like Indian Premier League have played a huge role in bringing competition in Cricket and affected the earnings of cricketers. Introduction of Hockey India League is likely to prove beneficial for players by providing a lucrative option to them, which would increase their market value further up thereby pressurising the contractual wage to move up. Indian hockey players participating in international commercial sports events would further scale up their value.

Hockey, recently, has not been free from tensions in India. The argument for reducing government intervention might work here as well, since government grants have been insufficient when it comes to providing adequate facilities. This feeds back on the performance and consequently profit generating capacity of the hockey team. To separate the administration of sports from the government might prove efficient from the point of view of performance of the hockey team and hence the popularity of the sport.

But certainly, the popularity of the sport depends more on the demand rather than the supply factors. Con-

sumer substitutability amongst the sports (all of which are a source of entertainment) determines the popularity ultimately. A case of complementarities can be seen here. Lower amount of resources with the governing body entails less number of hockey camps for young players and lower performance by the national team, which implies lesser interest in the game and hence lower audience and lower amount of talent for the game.

So, the next time you miss an Indian hockey team match, remember that the team (and importantly, our national sport) loses something even if they win the match!

Acche Din Aane Wale Hain

K.Bharath, I year

It has been 10 months since the Narendra Modi -led NDA government came to power after securing a majority in the 2014 General Elections. Since then, there has been a lot of buzz and excitement over the functioning of the government and its agenda.

The Indian Economy saw a great shift in the minds of its stakeholders, bringing in a new spirit of hope and optimism. Many businessmen and investors from all over the world exclaimed this as a pro-business government and India soon became the talk of the world. This essay takes a look at the significant changes that occurred in the Indian Economy over the past ten months.

Key Developmental Projects

Development is our agenda. These are the words of the Prime Minster of India on several occasions. In this respect, the government has proposed and initiated a number of schemes which are as follows.

Pradhan Mantri Jan Dhan Yojana (PMJDY): It aims at creating a comprehensive financial inclusion in the country.

Sansad Adarsh Gram Yojana (SAGY): It aims at creating Model Villages by providing them with basic amenities such as housing, healthcare, education, etc. The Prime Minster has asked every MP to create atleast 3 Model Villages in their constituency by the end of their tenure.

Swachh Bharat Abhiyan: It emphasises on cleanliness and hygiene all over the country, covering 4041 statutory towns. The vision is set to be achieved by 2 October, 2019, the 150th Birth Anniversary of Mahatma Gandhi.

Make in India: This initiative by the government is aimed at encouraging various Multinational Corporations (MNCs) to manufacture their products in India. This can be regarded as one of the standout schemes which if implemented can bring about a massive change in the Indian Economy.

The government brought about a big change in the country by scrapping the 64 year old Planning Commission and replacing it with a new think thank called the NITI Aayog (National Institution for Transforming India Aayog). As is being said, the state governments will play a pivotal role in framing policies and allocating funds along with the Central Government.

In an age where science and technology is growing at a rapid pace and digitalisation has become the key to progress, the government has placed emphasis on creating a *Digital India,* ensuring the availability of government services electronically and also to connect rural areas with high speed networks. One of the main initiatives towards creating a *Digital India* can be seen from the visits made by Global Technological CEOs like Mark Zuckerberg, Satya Nadella and Jeff Bezos to India and their respective meetings with the top leaders of the country including the Prime Minister in recent times.

Though all these schemes appear to be brilliant on paper, the government will face a lot of hurdles that need to be overcome during the implementation.

Annual Budget and Economic Survey

The annual budget presented by the Finance Minister did not come out with any big fireworks as it was more reform- oriented rather than a populist one. The major highlights of the budget are as follows. Introduction of Goods and Services Tax (GST) from April 2016 can be regarded as the biggest eye catcher of this year's budget and also the biggest change in the tax structure of our country. Once implemented, the GST will bring in uniformity in tax rates all over the country. Though the states lose autonomy over the tax rate

fixation, one should understand that the GST is a long term strategy which will lead to an increase in revenues for both the centre and the states. Second, the clubbing of the Foreign Portfolio Investment (FPI) with the Foreign Direct Investment (FDI) is another major reform announced, as it will bring in more clarity in the norms and reduce ambiguity and increase the ease of doing business. The disinvestment target in Public Sector Undertakings (PSUs) for the FY 2015-16 would be around Rs 40000 to Rs 45000 crores. The Subsidy Bill of the government is expected to reduce due to free fall of Oil Prices in the world economy (Subsidy on fuel accounts close to 25% of the total bill). Last, improving the effectiveness of the tax collection system in the country by widening the tax payer base and reducing the amount of unaccounted money was another important announcement.

The Ministry of Finance also came out with its Annual Economic Survey 2015 which predicts a growth of 8.1-8.5% for the financial year 2015-16. The report also stated that double digit growth will soon become a reality in our country. The fiscal deficit target set by the government for the fiscal year 2015-16 is 3.6% of the total GDP (a decrease of 0.5% from the current year target).

Current Economic Situation and Key Reforms

The Country is experiencing a decrease in Wholesale Price Index over the past 6-7 months, with the rate being -2.06% in February 2015 compared to 5.2% in July 2014 and the free fall of oil prices in the World Economy (oil was $115 a barrel in June 2014, now around $60 per barrel in February 2015) has also had a great impact on the oil prices in the Indian Economy with the government decreasing the price of petrol and diesel. The government made a big impact recently by increasing the FDI in defence and insurance from 26% to 49%. The recent move of the government in making a transparent and open process of auctioning coal mines and telecom spectrum band only goes to reinforce the commitment of the government in transforming our country. Also, the government is keen on simplifying the land acquisition process for creating social infrastructure, which will have far reaching implications on the national socio-economic fabric of India.

Though it may seem that India is on the right path towards development, the country lacks in certain aspects. India is ranked 142nd in the world when it comes to *Ease of Doing Business*. This can be attributed to the stringent rules and norms that make it cumbersome to carry out a business. Moreover, the Economic Survey shows that there are a lot of projects stalled, both in the public and private sector, which need to be restarted. The Government must also try to remove corruption right from the grass roots as it plays a huge negative role in the implementation of various schemes and programs.

As Mr. Arvind Subramaniam, Chief Economic Advisor to the Government of India said – "India is a recovering economy, not a surging one", one can expect our country to become a developed nation over the next decade and not immediately.

The promise of *Acche Din Aane Wale Hain* (Good days are coming) migt take some time, for this vision will surely become a reality, but patience and optimism are what are required right now. The major challenge for this government will be to ensure that this transition brings about a fundamental change not only in the quality of living of its citizens but also in the quality of governance and make the process of transition as painless as possible on the people of this country.

Network Neutrality and Why India Should Pay Attention

GUEST ARTICLE: Tanya Vaidya, ARSD College

During December 2014, Bharti Airtel received strong opposition from consumers when it announced a new tariff plan under which the use of Voice over Internet Protocol (VoIP) services like Viber and Skype would be chargeable even if an internet scheme had already been purchased by a consumer. In the face of public outcry over this proposed plan, the company soon withdrew the idea.

The main objection made against the proposal was that the plan violated the concept of Net Neutrality. The concept of net neutrality propounds that Internet Service Providers (ISPs) and other network operators cannot deliver certain data packets faster than others based on the criteria such as type of application, source and nature of content etc.

Since the inception of the Internet, information packets have been transported in accordance with this concept. The NGO Common Cause defines net neutrality as *the principle that Internet users should be able to access any web content they choose and use any applications they choose, without restrictions or limitations imposed by their Internet service provider*. Under this system, there is no distinguishing between units of data depending on the services for which they are used or the identities of the up-loader or downloader of the data. In other words, when a customer pays her ISP a subscription fee to use the Internet, she is given access to the whole Internet at once. Her ISP cannot charge her separately for the use of Buzzfeed, for example, or simply deny her access to Twitter.

The idea of a *perfectly neutral* network is a dangerous one, however. A perfectly neutral network will not prioritize any data packet over another. This may be problematic as certain types of data packets, like error messages and router-to-router traffic, need to move faster than others. Without this discrimination, the network will not be able to function. Offering a solution to this predicament, Tim Berners Lee –the inventor of the World Wide Web –explains that net neutrality must mean that there is no discrimination between data packets of similar applications and not a purely neutral transmission regardless of the application in question. He argues that some applications are more sensitive to jitter (signal distortion) and latency (delay). Latency-sensitive applications like video streaming services cannot tolerate miniscule delays in data packet delivery. However, e-mail services can do so. Treating both applications in the same way is discriminatory against latency-sensitive applications.

There are certain trends, whose existence ensures a favourable environment for the violation of net neutrality by ISPs. These trends include an increase in the use of applications that have low latency features or use high bandwidth, such as streaming video or audio, VoIP applications and online games. Another trend is the increasing use of wireless home networks which allow multiple people (sometimes even multiple families) to share an internet connection, thereby reducing revenues for ISPs. Even improvements in network technology which make providing broadband service less expensive encourage ISPs to violate Network Neutrality.

From an economic point of view, the departure from network neutrality regulation will have two primary consequences-first It will introduce the potential of two-sided pricing on the Internet such that the ISP that controls internet-access of the end consumers will charge a fee to content or application firms *on the other side* of the network which did not have a contractual relationship with it before. This means that content and application providers such as Google, Yahoo, MSN, or Disney will be forced to pay its consumers' ISPs to ensure that their consumers can access their services. The ISPs would also be able to apply different prices to different content providers, even for the same type of information transmitted to consumers. This could result in situations where residential ISPs will charge Google more for making the Google search service available to consumers than what it will charge Microsoft for making its search service available. Second It will introduce the possibility for prioritization, which may enhance the arrival time of data packets originating from paying content and application firms and may degrade the arrival time of data packets that originate from non-paying firms. This has the possibility of increasing efficiency of packet transfers over the

Internet, such that more time-sensitive packets are given prioritized access. But it can also effectively exclude access to non-paying firms' content and applications. A possible consequence would be that start-ups will be virtually unable to build a consumer base. The average consumer will frequent services and apps that are more accessible i.e. faster to use for her. For example, let's assume that a new video streaming service known as VidShare is founded in the absence of network neutrality. A consumer will experience slow download speeds on VidShare whereas her access to YouTube will be fast an unaffected as YouTube pays her ISP a fee. She will not feel that *the internet doesn't work,* she will think that VidShare is a sub-par service and not worth using. Thus, new entrants in the market and small businesses will not be able to establish and scale themselves respectively.

In a paper written by Nicholas Economides and Joacim Tåg titled *Network neutrality on the Internet: A two-sided market analysis*, in which the issue of one-sided pricing vs. two-sided pricing is discussed, some interesting conclusions are presented.

In this study, the Internet broadband market is modelled as a two-sided network consisting of broadband users on one side and content and applications providers on the other, with an ISP connecting the two. Prices imposed on both sides by the ISP have direct implications on the number of broadband consumers as well as on the number of active providers of content and applications. Within this constructed framework, network neutrality is defined as the restriction that the price charged to the content providers by the ISPs is constrained to zero.

It is found that in a monopoly setting, network effects between consumers and content providers can provide a rationale for enforcing network neutrality regulation. For some parameter values, preventing residential ISPs from charging content providers for making their services available to residential consumers increas- es the total social surplus. However, there also exist parameter values for which this result is overturned. However in a duopoly setting, imposing network neutrality weakly increases total surplus. Furthermore, it is found that when everyone has internet access, network neutrality will always increase total surplus if content providers value consumers more than consumers value content providers.

There exist many arguments that reason that net neutrality is detrimental to networks, economies and people. The opponents of net neutrality claim that unless innovative services receive priority over other kinds of Internet traffic, their quality will remain poor, which will prevent them from fully developing. However, this reasoning is flawed in its very core. The innovation and creativity that characterized the rapid growth of the Internet is at risk of imposition of economic control by a few large private interests in the absence of neutrality. One of the main consequences of violated net neutrality will be the emergence of a two sided market where content creators will be paying ISPs in order to ensure that consumers can access their services. In this environment, it is obvious that new entrants will be at a systemic disadvantage. This set-up rewards collusion in the market, not innovation.

In the view of many, a political intervention in the net neutrality dilemma will actually support the free market, as it will prohibit unfair practices imposed by non-transparent monopolies. They warn that unless net neutrality is ensured through governmental regulation, unseen distortions tantamount to subliminal manipulations through imposed availability and slowdowns will alter customer practices, not through choice, but through artificial norms dictated by ruling commercial entities.

Moreover, advocates of network neutrality argue that in its absence, content providers that can pay will be able to get a commercial advantage over those that cannot. Thus, institutions like universities and charities would suffer. These policies will eventually result in the creation of a *two-tiered Internet*, in which those having *VIP* access will enjoy privileges in terms of speed and access to certain contents. For many content providers like charities, universities and services that target young people or those on a budget, this could mean not being able to reach their audience.

Pricing schemes rest on the assumption that traffic usage by each of the end-users is roughly equal and is within some reasonable limits. However, traffic consumption by the end-user tends to be much higher than

average when users engage in practices such as peer-to-peer file sharing and installing wireless connections (which allows multiple consumers to use one connection). Faced with this situation, providers claim that they have no other option to avoid losses, short of raising the fee for all subscribers, but to fight such practices.

Critics of net neutrality also say that prioritization of certain traffic should not be prohibited if both content providers and ISPs agree on the terms of their cooperation. Depriving Internet providers of these sources of revenue will limit the amount of funds available for investment in further development of network infrastructure. However, it must be understood that there is no guarantee that the returns from the investment in infrastructure, if any, will be distributed in an equitable way. According to supporters of net neutrality, if everything is left to market forces, *islands of enhanced service* will develop. This would lead to increased investments in such islands and less investment in the general development of the network.

Many also regard net neutrality regulations as an infringement on the private property rights of network owners. They feel that although no single entity owns the internet in its entirety, many individual sections of the internet are privately owned and operated. On the other hand, many believe that the internet is a public good. And thus requires regulation to maintain its neutrality in order to ensure fair and equal access for all consumers. Without legislation, they believe that commercial interests will override consumers' rights and pricing distortions, rather than improvements in service, will direct market share.

Ed Whitacre, former CEO of AT&T, was quoted in BusinessWeek referring to his company's Internet infrastructure: *'Now what they would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it.* However, no one is using the Internet for free. In a transmission of a data packet, the ISPs on both sides pay the Internet backbone and each ISP is paid by its customer.

Besides economic effects (unfair practices by monopolies and lack of competition in the Internet access market), the creation of a two-tiered Internet and, essentially, a limitation of end-user choices can have strong political consequences. By slowing or hiding access to certain contents, ISPs can, in the long-run, shape the users' information environments and indirectly influence their opinions and choices. Even though this scenario may be unrealistic for the near future, the possible long-term effects of decisions made today should not be overlooked.

The Net Neutrality debate is taking place in various parts of the world right now. However, this debate is of special importance to developing nations. Developing countries are especially vulnerable to the negative effects of Internet segmentation because they lack the tools and experience to tackle them. They are often characterised by weak institutions which make them sensitive to net neutrality violations. Those who live in these countries already pay more for goods and services due to factors such as lower levels of competition. For example, Venezuelans pay three times the amount that Americans do for internet access. Violations of net neutrality exacerbate the lack of competition in these economies and ultimately harm the people.

In 2010, Chile was the first country to make net neutrality provisions to its General Telecommunications Law. But Chile's blanket application of the principle has invited criticism. On June 1, 2014, Chile put an end to giving big companies zero-*rating* access to their services—a widespread practice in developing countries. Zero-rating refers to large companies, like Facebook, being able to make deals with mobile operators to offer the most basic version of their service without charging customers for data use. The details of these deals are unclear, but big companies may pay mobile operators for the privilege.

In fact, zero-rating has also entered the Indian market in the form of Facebook's internet.org initiative for which it has partnered with Reliance Communication in order to give millions of Indians free access to Facebook and several other applications such as Wikipedia, BBC etc. Google has also started discussions regarding a zero-rating plan with other application developers like RedBus, Flipkart and Ola Cabs. In the past Google had collaborated with Airtel and rolled out a scheme known as *Freezone* wherein 1 GB worth of free access to Google applications every month was given to consumers.

On paper, these initiatives seem very noble. Internet access could be beneficial to India's population in a multitude of ways. Farmers could have access to hourly weather reports, high school graduates in small towns could apply for college programs in major cities without having to travel long distances and new mothers in villages could easily obtain information about the healthcare programs for children around them. For people who do not have access to the internet in the first place, an inexpensive entry to the information superhighway does not seem to have any down sides.

However, reality might not be so favourable. While being a blatant violation of net neutrality, this initiative will also control the content people will experience. Moreover, it will effectively kill a large number of online enterprises that will be unable to collude with large corporations like Google and Facebook. Violating Net Neutrality will make it harder for low-cost innovation to succeed. This is especially disadvantageous for developing countries as they are often the places that need such innovation the most. Would there have been a Flipkart or a Zomato if ISPs were able to discriminate against them?

According to Susan Crawford, visiting professor of law at Harvard University and a co-director of Harvard's Berkman Center for Internet & Society, it is *a big concern* that Google and Facebook are the ones becoming the portal to Web content for many newcomers. 'For poorer people, Internet access will equal Facebook. That's not the Internet—that's being fodder for someone else's ad-targeting business,' she says. 'That's entrenching and amplifying existing inequalities and contributing to poverty of imagination—a crucial limitation on human life.'

India still has a long way to go when it comes to Network Neutrality. In an interview with Indian Express, the Telecom Regulatory Authority of India (TRAI), Rahul Khullar asserted that Airtel's proposed tariff plan was not in violation of any laws. "What the company plans to do is certainly not in conformity with net neutrality. But one cannot say the move is illegal today as there is no policy either by the government that net neutrality is our principle or a regulatory framework put in place by the regulator", he said. So while India doesn't have any laws concerning net neutrality for TRAI to enforce, whether any steps will be taken to achieve this goal before the people of this nation fall to the mercy of corporates remains to be seen.

The Economics of Peace

Samiksha Katyal, I year

War is a general belief to push the enemy down, in a way that he is harmless further. War has enormous costs to Life, to freedom, to prosperity. A rational burden of justification is rarely met. And rarely is there any justice after war, either. The losers may be punished, but the winners almost never face justice for what they inflicted on their victims.

Many people believe that if one person profits, another has to lose. Such people believe that the sum of the benefits and the losses is zero, meaning for every gain for some, there is a corresponding and equal loss for others. If that were the only possible model of prosperity, social conflict would be omnipresent and war would be inevitable.

Fortunately, there are other models in existence where the possibility of prosperity does not involve corresponding loss for others. The contemporary world is a strong evidence of that, as incomes have gone up virtually everywhere in the world. Most people live longer, healthier and wealthier lives than in the past. Not only are more people prospering, but an ever-larger percentage of the world's population is doing so, as well.

One of the most important economists of all times explained clearly and directly how your gain may be my gain, as well. In doing so, he explained not only the economic foundation for material prosperity, but for peace. Jean-Baptiste Say (1767-1832) is sometimes considered the 'French Adam Smith', but in fact he was much more than merely popular for Smith's insights. He advanced significantly on Smith's thought. Like Smith, he was a critic of war, colonialism, slavery, and mercantilism and an advocate of peace, independence, liberation and freedom of trade. Say advanced beyond Smith, not only in explaining that services have value, but that the creation of goods and services is the source of demand for other goods and services. That is sometimes called, *Say's Law of Markets*. It is a very important insight, not only for *macroeconomics* but for social relations generally, and for international relations in particular. If people are free to trade, the increasing wealth of one party is not harmful to, but beneficiary to the prosperity of their trading partners, for increasing prosperity of one trading partner means that there is more effective demand for the goods and services of the others.

Nations will be taught to know that they have really no interest in fighting one another; that they are sure to suffer all the calamities incident to defeat, while the advantages of success are altogether illusory
-Jean Baptiste Say

Say explained that in an exchange economy humans should be seen as producers and consumers. To produce is to give value to things by giving them utility. The progress of industry is measured by the ability to generate new products and to reduce the price of already existing products. When more goods are produced, it means that the prices will be lower than they would be otherwise, which means that there is additional purchasing power leftover for the consumers to buy other goods.

Say explained the important role of entrepreneurs in the market. Entrepreneurs have very often been portrayed as visionary geniuses who possess extraordinary abilities and comprehensive knowledge of markets, techniques, products, tastes, people and so on.

Peace is the first condition of economic development. People do not invest or plan for the future as much as when they are being massacred or threatened with massacre as they do when there is peace. Say stressed the importance of limiting plunder by government. Government violates property not only when they can take away industries and lands, but also when they prescribe or prohibit certain usages of one's property. Say believed that governments should be limited and govern by rules and that *no nation has ever arrived at any degree of opulence that has not been subject to a regular government.*

Peace and Liberty are a matter of choice. They have uplifted and are uplifting billions of people from poverty and wretchedness. Peace is obviously the first condition of mutual economic enrichment among nations. War destroys, cripples, and blights human lives, obliterates wealth, creates hunger, and wastes scarce resources. Wars are negative sum games. One of the tasks of Political Economy is to demonstrate their cost and the value of peace. The reason for the marvelous wealth of Switzerland or Sweden today is that they did not blow up themselves in any of the two world wars.

Peace and free trade reinforce each other to produce not only economic developments, but also genuine wealth and human flourishing.

Economics of Education from a Sociological lens

Simoni Jain, III year

This essay will study the economics of education from a sociological perspective, incorporating the socio-economic factors at play in the real world into classical microeconomic models. The methodology adopted is reviewing the existing literature on factors affecting educational outcomes, analysed in micro-level randomized controlled trials, and incorporating the same in the economic framework of cost-benefit analysis. The aim of the essay is to study the effect of sociological variables on consumer preferences in relation to educational decisions so as to allow our theoretical models to mirror real world outcomes.

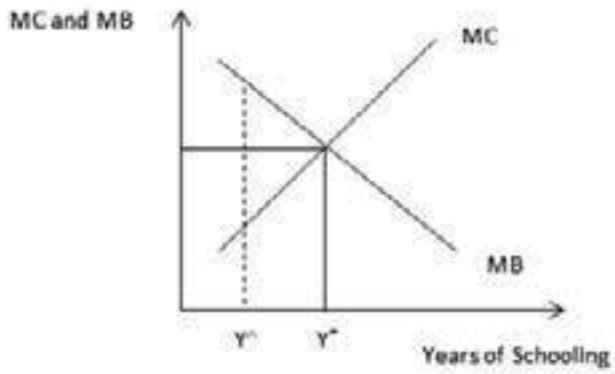
Economics of education, under a microeconomic framework of analysis, provides the basis to study individual choices in the demand for education. The area of research encompasses studying investment in human capital, choice of schools and level of education, returns to education, and many other issues. As universal primary education was listed as a Millennium Development Goal by the United Nations, a number of impact evaluations were conducted wherein the analytical rigor of economics was used to study the effects of government interventions in the education sector, to enrich the resource base needed to inform the education policy discourse.

The basic model of human capital investments works on the assumption that education is an investment that accrues benefits as higher future earnings, but entails costs that are borne in the near term. For a marginal cost-benefit analysis in the model, the future returns are discounted to make its value comparable with the costs incurred in the current period. Under the assumptions that people maximize utility and take lifetime incomes into consideration when making a decision, investment in schooling is attractive only if the present value of future benefits exceeds costs:

$$\frac{B_1}{1+r} + \frac{B_2}{(1+r)^2} + \cdots + \frac{B_r}{(1+r)^T} > C \qquad (1.1)$$

Figure 1 graphs the model that is implied by 1.1, in terms of the present value of marginal benefit that accrues to an individual and the marginal cost he faces for each additional unit of human capital acquired, which can be understood as each additional year of schooling. The marginal benefit (MB) curve has a negative slope because each added year of schooling means fewer years over which benefits can be collected. The marginal cost (MC) for each additional year of schooling can be assumed to be rising as acquiring secondary and higher education is costlier than primary education (Ehrenberg, Ronald G and Smith, Robert S, 2006). The optimal number of years of schooling for any individual would be where the marginal cost equals the marginal benefit, that is at Y* in Figure 1.

Figure 1



This analysis, which relies on assumptions about the individual's preferences, needs to be altered when we study the decisions about investment in primary and secondary education of a child. In case of schooling, parents are in a position of power relative to their children as parents make the investment for children, who may repay this investment with old-age security for parents. It is the parents' decision as to who is enrolled in schools and who is sent to work. These decisions are based on their financial abilities and expectations regarding the ability of a child. Relative power thus becomes a function of income of the parents.

Returning to Figure 1, we can model the real world outcomes as a result of a power- weighted decision rule. The parental ability to financially support a child's education affects the level of schooling that the child receives. Low income levels induce a sense of present-orientedness as the present economic conditions of low consumption levels and deprivation makes them weigh future events or benefits not too heavily. They are more occupied with meeting sustenance demands. In terms of equation 1.1, a present- oriented person assigns a very high value to the discount rate r. A higher r makes the present value of benefits associated with education lower than if r was smaller. This will result in a lower level of education acquired by an individual than the optimum, denoted by $Y^{\wedge}$ to the left of $Y^{\blacklozenge}$. In essence, a rich child may get more education than a poor one even if the valuation of marginal benefits is the same for both.

Extending the analysis to the case when a rich child is not particularly talented and has a lower marginal benefit curve than a talented poor child, that parental income plays a vital role in determining educational investment; the poor child may be deprived of an education that is optimal in the long run.

The analysis can be extended from the normative framework of conventional cost-benefit analysis to study the factors that determine these costs and benefits in a sociological understanding. The cost-benefit analysis so far was modelled on market prices that would prevail in the hypothetical world of a perfectly competitive general equilibrium, which are based on three exogenous factors: the initial endowments, consumer preferences and technology. Analysis of the vast literature on impact evaluations of educational interventions in developing nations reveals that the preferences of children of lower income families are altered by sociological factors such as a) mother's literacy and participation in programs on child learning; b) educational incentives in the form of conditional cash transfers and rewards for parents and children; c) remedial classes for children; d) teacher's expectation regarding the ability of a child which determines her effort level.

Low learning levels have been associated with the home environment as parents with low levels of income are less involved with the child's educational activities, are less productive in their involvement and invest lower in education due to lower expectations regarding the abilities of their children (Banerjee, Berry and Shotland, 2013). These have a causal relationship with the low education levels of parents. A randomized evaluation of three interventions in rural India designed by Pratham, an educational NGO in India, to improve child learning outcomes through increased mother literacy and direct encouragement of learning a home showed positive results. Households were assigned into one of four groups that received either: (1) adult literacy classes for mothers, (2) training for mothers on how to enhance their children's learning at home, (3) a combination of the first two interventions, or (4) nothing, which serves as the control group. Mothers are the targeted recipients for they are said to be investing more in household public goods (Duflo 2003; Lundberg, Pollak, and Wales 1997). The results of their analysis are such that the three programs had statistically significant effects of 0.04, 0.05, and 0.07 standard deviations on children's math scores, respectively. They also find that the interventions increased women's empowerment, mother participation in child learning, and the presence of education assets in the home.

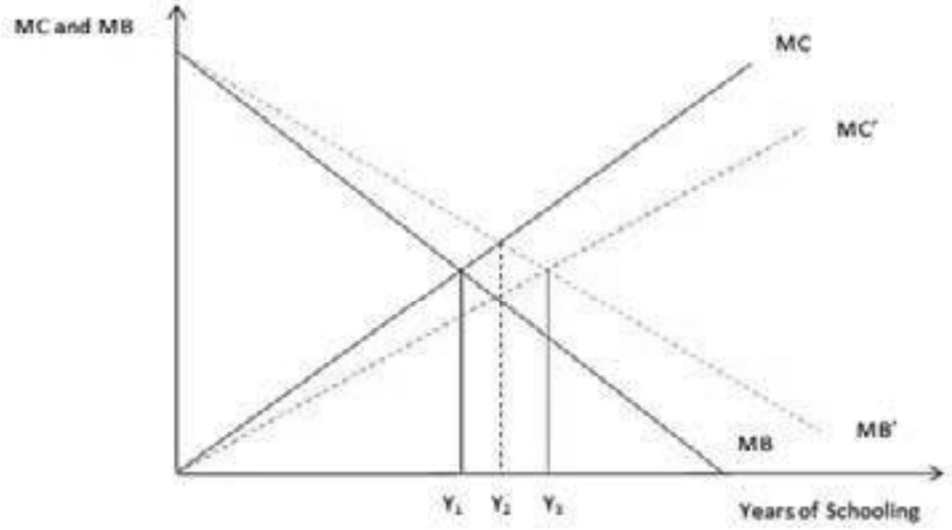
Thus, learning outcomes in each schooling year is a function of amount of time invested in educational activities by a child and the productivity of that time. This in turn is dependent on the child's preferences. At the primary level, a mother's preference for educational outcomes and her level of learning impact the child's learning outcomes, as evinced by the results of the randomized control trial.

In our cost-benefit, such literacy and participation programs for mothers which improve child's educational outcomes shift the original marginal benefit curve to the right at MB'. Higher learning outcomes in each

schooling year improve productivity and earning prospects thereof (Hanushek and Woessmann, 2007).

Such sociological factors that affect the valuation of marginal benefits change the optimal outcomes for children. The new marginal benefit curve (MB') now intersects the marginal cost curve (MC) at a higher level of education, denoted by Y. Such an improved level of education will translate into higher earnings in the future.

Figure 2



Another factor which alters a child's preferences in relation to educational decisions is educational incentives and conditional cash transfers. A field experiment was conducted with primary schools in urban slums in Gurgaon, India, to test the effectiveness of targeted cash and in-kind transfers to learn. The experiment was designed in such a way so as to give varied incentives to different parties. Each recipient would fall in one of the four categories: a) money given to the mother as a reward on a child's achievement of a literacy goal; b) money given to the child on achieving the literacy goal; c) a toy given to a child of equivalent value; d) a voucher redeemable for a toy given to the child. The literacy goal for each child was based on his pre-test score. The results of the experiment concluded that the identity of the recipient or the nature of the incentive did not have an impact on the aggregate outcome, though the child's initial test score did have an impact. That is, children with lower pre-test scores performed better when provided a toy or voucher as an incentive relative to parent or child money, while the reverse was true for children with higher pre-test scores (Berry, 2014).

To incorporate the effects of such conditional cash transfers in our cost-benefit analysis, we may see them as reducing the marginal cost of each year of schooling, either as subsidising the cost of school fees and books or as reducing the psychic costs that children associate with learning. This will shift the marginal cost curve down to the right, to MC', which will lead to a higher optimal level of education, at Y_2.

According to the Annual Status of Education Report (ASER), 2013, which highlights the learning outcomes of children in India, close to 70% of government- school students in third grade could not read at the first-grade level and 80% could not do simple subtraction. Pratham, the educational NGO hat runs ASER, not only reports the deficiencies in the educational system but also provides remedial action to improve the learning outcomes of children in India, particularly in the government schools for there has been a widening gap in learning achievements between the private and public school children. The Balsakhi program was initiated by Pratham. It was a remedial education intervention wherein a tutor was hired in about 600 schools in Vadodara and Mumbai to assist children who lacked behind their peers in basic reading and arithmetic.

The program had substantial positive impacts on children's academic achievement. In both Vadodara and Mumbai, the Balsakhi program significantly improved overall test scores; by 0.14 standard deviations in the first year and 0.28 standard deviations in the second year, with the largest gains in math. Moreover, the weakest students, who were the primary target of the program, gained the most (Banerjee, Abhijit, Shawn Cole, Esther Duflo and Leigh Lendon, 2007).

Such remedial initiatives deliver positive outcomes because it addresses the lacuna in the education system. There is an inherent bias in the learning process for the prerogative becomes to prepare the best-performing child, and not the average child who requires learning assistance to cope up with the rest. Neglect in the primary years creates a bias against the slow-learners for parental expectation regarding a child's abilities, especially in poor families, is a factor in determining which of the siblings go to school. The dual forces of elevated expectations and little faith create an education based poverty trap for small children when there exists none in the first place (Banerjee, Abhijit and Esther Duflo, 2011). Such parental pressure at a young age lowers the confidence of children and they internalize the fact that it is their lack of their cognitive abilities that is responsible for the low learning achievements. As a result, a child who finds studying in the school difficult blames herself and not the teacher. This lowers her valuation of the benefits of education and shifts her MB curve down to the left, resulting in lower levels of education and future earnings.

Also, evidence is suggestive of sociological determinism in the context of teacher performance. Teaching quality is poor in public schools where the children are mostly from low-income backgrounds. This is so because teachers perceive the ability of a student from an economically-backward family to be intrinsically low. Backward areas are seen as infertile grounds for a teacher's effort. In a study to find out whether teachers were prejudiced against students from economically poor families, they were asked to grade a set of exams. Half the teachers, chosen randomly, were given the full name of the students (which revealed the caste of the student) and the rest were anonymous. Results indicated that, on average, teachers gave significantly lower grades to lower caste students when they could see their caste than when not. They had a pre-conceived notion that these children could not fare well. This again lowers the MB curve for the economically poor students.

Sociological factors such as this affect the real outcomes at the societal level. Conclusively, children of the rich go to schools that not only teach more and teach better, but also assist the child in learning. The children of the poor attend schools that makes place only for the exceptionally talented and are expected to drop out, in case they fail to cope up. Thus, such perspective on educational choices and outcomes beyond the framework of traditional analyses alters our conventional understanding of economics of education.

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Review of Ha-Joon Chang's Economics: A User's Guide

Akash Bhatt, II year

On 2nd November, 2011, Harvard professor Gregory Mankiw had to face something unprecedented in his classroom. As he was taking his hugely popular introductory economics class, around seventy of his students got up from their seats and walked out of the room. Later interviews revealed that these students were protesting against the inherent conservative bias in the economics courses they were taught. They demanded to study economics which was closer to the world they could see around them. Most of all, they wanted an end to a particular way of thinking about economics (read neoclassical), being taught as gospel truth.

Ha-Joon Chang's book, *Economics: A User's Guide*, is a similar protestation, although much less dramatic. A professor at the University of Cambridge, Chang has been known to question economic *facts* on which most of the experts have reached a consensus (his earlier book *23 things they don't tell you about Capitalism* makes for excellent reading too).
In this book too, Chang starts out with questioning the way economics has started being defined in terms of its methodology, rather than its subject matter. This approach presumes the existence of a single method of doing economics. He counters this by explaining and critically analyzing nine different schools of thought in a later chapter as a proof of an ideological diversity every economist, or everyone for that matter, should know about. Considering that each of these has its pros and cons, it can be safely said that no particular ideological stream can be said to have a monopoly on the truth.
However, unfortunately, the widespread consensus on the validity of the neoclassical method is such that, many economics students graduate without ever hearing about schools of thought such as the Schumpeterian and the Austrian. The old foe, Marx, might be mentioned somewhere, but only to assert the superiority of the neoclassical way of thinking.
Chang is not praising or criticizing any of the ways of *doing economics*; he is just trying to acquaint his readers with the fact that they exist. This is why this book becomes so important for undergraduates, who have been kept in the dark regarding any kind of heterodox economic theories.

However, this book is much more for the layman with minimum economic knowledge than for the professional. If there is one overarching premise of the book, it is *Economics is not a science*.
Chang wonders why common people are often found to have no opinion on economic issues, when inadequate knowledge does not stop them from having strong viewpoints on issues such as climate change, war and foreign policy among other things. He believes this is because economists have been able to convince people that economics is a *value neutral science* on which people should follow the expert consensus.
Throughout the book, Chang gives examples to try to prove why economics cannot be a science like, say Physics or Chemistry. For one, Economics involve humans, who are, by nature unpredictable. Second, he argues, that even behind seemingly mathematically precise *facts*, are often assumptions based on ethical principles and worldviews. For example, he wonders if there can be anything such as a free market, when the boundaries of the market are constructed and changed by prevailing moral standards of the time (Slaves were considered a tradable commodity, but our changing ethical standards ensure there is no market for them now). This book, then, is an effort to make people realize that Economics and Politics are inherently inseparable, and at the root of every economic theory or school of thought, lays a political argument.

Pointing to the many different ways of doing economics, and showing the value judgements that they all make, Chang urges the general public to critically analyse and question the expert consensus on the subject, because, as he says, *Economics is too important to be left to the economists*.

The book provides an overview of everything a person with an amateur interest in economics might want to know. Chang's lucid writing does not bog down the readers with complex mathematical proofs, or professional jargon. There are easy to read chapters on work, production, international trade and finance. One of the highlights of the book is a brief history of Capitalism, wherein he describes the development of capitalism in different phases, giving the most important trends, albeit without too many details, for reasons of

brevity.

In many cases, he questions some of the most accepted *facts* in economics. These include things such as the efficacy of free trade for guaranteeing prosperity (he shows how growth stories of Britain and America began with a spell of protectionism) and the much maligned obstructionist role government intervention plays in growth (in Singapore, whose growth story is cited often, the government owns almost all the land, and state run enterprises account for 22% of national output).
This book, then forces one to rethink the assumptions that have been taken for granted for too long.

If you agree with Gloria Steinem, who said, "The first problem for all of us, men or women, is not to learn, but to unlearn", Ha-Joon Chang's latest book is a very useful place to start.

'As far as NREGA is concerned, it is already a DBT!'

Interview with Dr Reetika Khera

Dr Khera teaches economics at Indian Institute of Technology, Delhi and her research is primarily focussed on development in rural areas. The editorial board interviewed her online and talked about the Mahatma Gandhi National Rural Employment Guarantee Scheme and the Political Economy of Education in India.

E.B. The NREGS has been criticized for its productive value but has also been praised for the significant role it has played in providing *employment* to rural labourers. What measures do you think are essential and demand immediate attention to improve the productive value of the scheme without impacting its employment generating ability?

R.K. The beauty of the design of NREGA is that it can create win-win outcomes: providing economic security to the poor while creating assets which benefit even the better off. Those who work on NREGA worksites tend to be the poorest (e.g., landless households and small and marginal farmers). The assets that are created benefit everyone, including wells on the farms of the landed, land-levelling of fields, roads, etc. Now, many of these assets do not look like urban commentators visualize assets: for them, the only good roads are those which look like highways; land-levelling which just seems like moving mud around actually bring land under cultivation and increases productivity of existing fields. There are several studies which suggest that NREGA assets are in fact useful and the economic returns can be quite high.

Having said this, the asset creation potential of NREGA has not been adequately realized. This is because of inadequate technical support and weak accountability of administration. For instance, there aren't enough engineers to think creatively about the asset creation potential; the engineers that are there are often overburdened, so even run-of-the-mill designs are poorly supervised and implemented. Often the technical skills that are required are quite locally available – e.g., while constructing a road, local residents can tell where a culvert will be required; or, because they know the lay of the land, they are better suited to select the location of a pond or a well. Simple measures such as a *skill ladder* for NREGA workers, whereby an ordinary worker can move up to become a worksite supervisor, undertake measurements, etc, can help improve the programme.

E.B. Some proponents of NREGS argue that it has helped in pushing rural wages upwards while others argue that it has provided employment in lean seasons. These are seemingly contradictory. Did NREGA actually help push the rural wage upwards?

R.K. Yes, NREGA has contributed to raising rural wages, but there are two important caveats: one, that rural wages have risen too little and two, the role of NREGA has been relatively small in that increase. One of the main aims of NREGA was to stop the exploitation of labour where labour could be paid as little as Rs. 20/day! Since 2005 there has been a small increase in real rural wages, but this increase has been on account of many factors (e.g., withdrawal of women from the workforce) apart from NREGA. It is important to remember that "inclusive growth" is possible only when the rate of growth of wages for the poorest section is high, so the increase in growth rates of rural wages is a welcome development.

It is also worth pointing out that NREGA guarantees 100 days of work per year for a family. In fact, the average days of work generated has been much lower (around 40 days). Think of a family of four, with two adults. Out of more than 600 person days for which two adults are available, NREGA can provide a maximum of 100 days, but in fact provides just about 40 days! You can see immediately that the extent to which NREGA can tighten the labour market is quite limited.

The limited impact of NREGA on the labour market is corroborated by various researchers. Zimmerman (2013) finds that *private-sector wages increase substantially for women, but not for men, and that these effects are concentrated during the main agricultural season.* Studies by Clement and Papp (2014) and Berg et al (2013) also report a 5% increase in rural private sector wages, which can be attributed to NREGA.

E.B. How important do you think are direct benefits transfer (DBT)? Is it an alternative to NREGA?

R.K. The public debate has routinely confused different ideas - aadhaar, biometrics, cash transfers and direct benefit transfers (DBT). For example, recently a study (by Muralidharan, Niehaus and Sukhtankar) found that *biometric smartcards* improve efficiency of payments, but the media reported it as a success of aadhaar!

Aadhaar (or, UID) is the unique number generated by UIDAI. Cash transfers refer to the *form* of the transfer, e.g., cash vs. in-kind. Think of the Public Distribution System – the government can either provide subsidized food (an *in-kind* transfer) or it can give cash so they can buy the food themselves (a "cash" transfer). Cash transfer programmes also include government schemes such as old age pensions, maternity entitlements and so on, which are very welcome. On DBT, there is more confusion. For some (like me), DBT is just another word for electronic bank transfers, i.e., payments through accounts linked to CORE banking (which is the norm for us). For others, DBT is actually *aadhaar-enabled DBTs* – i.e., electronic transfers plus linking (or, *seeding*) bank accounts and databases of welfare beneficiaries using the aadhaar. For yet others, DBT is the new proposed design for transferring subsidies: the subsidy (on, say, kerosene) is credited into your account, and kerosene is bought and sold at the market price.

I think of DBT as electronic payments. This move is mostly very welcome as it provides a huge safeguard against corruption. The only drawback is that access to banks and post offices linked to CORE banking is still quite thin in rural areas. As far as NREGA is concerned, payments are routed through bank and post office accounts since 2009 – i.e., it is already a DBT!

E.B. Coming to education, is it right to say that the RTE, to some extent, is responsible for the poor education outcomes despite high enrolment rates?

R.K. Poor educational outcomes predate RTE, so I think it would be hard to make the case that the Act is responsible. There are, of course, many ways in which the RTE can be improved: e.g., I think the Act does not address the problem of teacher accountability, which is one of the reasons why educational outcomes are so poor.

E.B. What effect will this State's apathy towards education have on India realising its demographic dividend? Or are we being unnecessarily starry-eyed about the idea of demographic dividend?

R.K. To the extent that there is a demographic dividend to be reaped, there is no way it can be realized without investing in our main asset, labour. This requires investment not only in basic education, but also healthcare. From that point of view, the news in this year's budget is very bad which saw cuts for both these sectors for the first time in perhaps ten years!

Schools of Economic Thought

The Editorial Board deemed it fit to feature a section on the different schools of economic thought, as in the contemporary scenario of education in Economics most of them are sidelined by one or two celebrated schools. In this section, Mohnish Kedia writes on the Neoclassical, Institutionalist, Behaviouralist and the Marxist school, and Janak Priyani writes on the Classical, Keynesian and the Austrian school.

Classical

The Classical School of Economic Thought, which had patrons like David Ricardo, Adam Smith and J.B. Say was the dominant paradigm in the 19th century. It inherited the tradition of Classical moral philosophers in thinking about the origins of value in labour and land.

The basic tenet of the Classical School was that free market is the most efficient way to allocate resources to economic activities. Consequently, they were against any government intervention in economic activity but required the state to play a significant role in so far as facilitating the market process is concerned, by, for example, establishing and protecting property rights.

They believed the output to be always equal to the long run potential of the economy. They also believed that markets, both commodity and factor market, remain at equilibrium and any disequilibrium is corrected immediately, underlying which is the assumption that prices are flexible in all the markets. This had implications for policy purposes as well because both fiscal policy and monetary policy would be rendered ineffective as they have no effect on the real output. This is called *Monetary Neutrality* as only real changes in the economy can affect the real variables. Monetary and Fiscal policy would only impact the nominal variables (prices), even in the short run. The market clearing result was taken so far as to claim that any unemployment in the economy is voluntary. There is no involuntary unemployment as people are always on their labour supply curves and since markets clear, if there are unemployed people they must be voluntarily so.

This was challenged when the Classical Economists were unable to explain the exorbitant levels of unemployment rates around 1930s when the world economy was in deep recession. This gave way to the Keynesian School of Thought.

Suggested reading: *On Classical Economics* by Thomas Sowell

Keynesian

J.M. Keynes, in the 1930s, countered the Classical view that the economy is always in equilibrium and presented the notion that the economy needs to be pushed towards equilibrium, thereby highlighting the importance of fiscal and monetary policies in maintaining output to the potential level. The Keynesian view is that aggregate demand is affected not only by consumption demand and private investment but also by government expenditure and therefore can affect output, at least in the short run. Monetary policy was also held important in affecting output in the short run. This was due to the recognition that prices are not flexible. Especially in the factor markets they are sticky, which makes policy actions effective. Keynes also believed that output was not always equal to the potential level and so some unemployment is involuntary in the economy.

In Keynesian view, the economy is in equilibrium when both the product market and the money market are in equilibrium. With the Keynesian theory it became possible to explain business cycle fluctuations in the economy. And not only explain but government intervention was thought to be most expedient in order to get the economy back from extreme ends of recession or boom to its normal course of action. It was under the influence of Keynesian economics and the wars faced by the world, of course, that the Bretton Woods System came into being in 1940s, which aspired to create a framework to regulate the monetary affairs of the participating nation states.

The Keynesian view lost much of the influence around 1980s when the US economy was faced with periods of stagflation i.e. inflation and stagnation, the cause of which was supply side factors, in which case fiscal and monetary policy could not do much for correction.

Institutionalist

'There is no such thing as an individual', was infamously said by Clarence Ayres, the American institutional economist. In their less extreme versions, institutionalists tend to argue that humans are the product of the societies in which they live and so are their decisions. In a very broad sense, institutions are the norms followed by individuals. These norms are created and enforced by different organisations, which can include state, firms, society, family or the individual who internalizes them.

The origin of the institutionalist school can be traced back to Thorstein Veblen, the American-Norwegian economist who published his influential book, *The Theory of the Leisure Class* in 1899 when he was at the University of Chicago. It is in this masterpiece, where he analysed the tendency of conspicuous consumption prevalent in the capitalist class and gave the famous textbook theory, the *Veblen effect*. Veblen's attack was on the assumption of a rational, selfish individual who was the unit of analysis for the dominant school of thought in those times. Marking a departure from the dominant ideology, the (Old) Institutionalist school was officially established under Wesley Mitchell, a student of Veblen.

The decline of the Old Institutionalist School started around mid-1960, as a consequence of the school's failure to theorize emergence, persistence and evolution of institutions. Moreover, its proponents (like Clarence Ayres) went overboard in emphasizing the role of institutions and undermined the importance of individuals. However, the school saw its resurrection around 1980's with the emergence of economists like Douglas North, Ronald Coase and Oliver Williamson, under the name of New Institutional Economics. The New Institutional Economics emerged with an important concept of 'transaction costs', which they claimed, play an important role in determining economic outcomes. These transaction costs were dependent on the nature of institutions we create.

Suggested reading: 'The Economic Analysis of Institutions', by V. Santhakumar

Behaviouralist

Humans have bounded rationality; they make decisions using instinct, habit and belief apart from logic. This is one of the central arguments put forward by the (relatively) young behaviouralist school. To see the point made here, consider the decision of having breakfast. Individuals usually form a routine about what to eat on a given day and when to have breakfast, so that they do not have to take the decision every day. Similarly, individuals use habits, beliefs and experiences (called heuristics) to make their everyday complex decisions simpler.

The 1978 Nobel laureate Herbert Simon argued that people do not possess God-like rationality as they do not have the unlimited capacity to process information, hence they have what he called 'bounded rationality'. Extending this argument to organisations, Simon argued that organisations also use heuristics by creating organisational routines and culture to compensate for the bounded rationality of individuals.

Behaviouralists have constantly used experimental economics to prove that individuals are not selfish beasts, rather have qualities like loyalty, emotion and fairness, much against the assumptions laid by Neo-classical and Marxian economists. Although, this has led them to lose sight of the bigger economic system, it has provided us with a more sophisticated understanding of how humans think.

Suggested reading: 'Thinking, Fast and Slow', by Daniel Kahneman

Marxist

One of the most influential philosophers of all times, Karl Marx claimed that capitalism as a vehicle of economic development is very powerful, but will collapse in future because ownership of private property would become an obstacle to progress. Further, he predicted that the economic system of communism will succeed capitalism.

In 1848, along with Friedrich Engels, Marx published his first book, *The Communist Manifesto*. Marx derived many important concepts from the Classical School, such as the labour theory of value and the presence of class in society. Extending the production based view of the economy given by the Classical School; Marx argued that the structure of the society is based on *the mode of production*. In very broad sense, the mode of production is made up of the *forces of production* (technology, machines, human skills) and the *relations of production* (property rights, employment relationships), upon which lay the *super structure* of culture, politics and other aspects of human life. Marx in some sense derived from the Classical School and also contributed to the Institutionalist School.

The Marxist School believes that class struggles are central to changes in economic systems, such as from feudalism to capitalism. Using the concept of class struggle, Marx had predicted that capitalism would collapse and communism would follow. Marx was also the first economist to point out the distinction between the firm and the market in a capitalist system. He called the market anarchic and pointed towards the planned order of the firms. Moreover, like Adam Smith, Marx also worried about the negative effects of division of labour on individuals. He claimed that fragmentation of work into finer parts would lead to the degradation of individual capacity.

Suggested reading: *Towards an unknown Marx*, by Enrique Dussel, in *The Routledge Studies in the History of Economic Thought*

Neoclassical

Established as the most dominant school of economic thought, the Neoclassical School evolved from the works of William Jevons and Leon Walras and was established concretely with the publication of *Principles of Economics* in 1890 by Alfred Marshall. This was also the time when the name of the discipline was changed from Political Economy to Economics, signalling a change towards making the discipline a pure science, free of value judgements.

Broadly speaking, the Neoclassicals defined the economy to be made up of rational and selfish individuals, who were devoted to maximization of pleasure and minimization of pain. They claimed that left alone, the decisions made by these self-seeking rational individuals will lead us to equilibrium. Along with this laissez-faire doctrine, the strong 'Pareto criterion' developed by Vilfredo Pareto allowed Neoclassicals to form judgements on social improvements, although the criterion remains highly debated on practical grounds.

Although the Neoclassical school of thought has come under attack due to strong developments like the *market failure approach* developed by A.C. Pigou and *information economics* by Joseph Stiglitz, George Akerlof and Michael Spence, it still has some unique strengths. The ability of the neoclassical theory to break down economic phenomenon to the level of individuals, gives it a high degree of precision and logical clarity. Nevertheless, the assumptions regarding the characteristic of an individual still remain debatable.

Suggested reading: *The Evolutionist Economics of Leon Walras*, by Albert Jolink, in *The Routledge Studies in the History of Economic Thought*

Austrian

The Austrian school has its roots around the late nineteenth century and it takes opposing stands against the methodologist and objective approaches of various schools towards economic concepts. It includes names such as Carl Menger, Freidrich von Weiser and Freidrich Hayek among others.

The Austrian school focuses on a subjectivist approach to Economics with its methodological individualism and a subjective theory of value. The theory of value put forward by this school departs from the conventional labour or land theory of value put forward by thinkers like Richard Cantillon, William Petty, John Locke etc. The subjective theory of value states that the value originates from the subjective valuation of consumers and so the objective measurement of value of a commodity is impossible. It shares the view with the Classical school that free market system is the most efficient way of allocating scarce resources with its price mechanism providing both a common determinant to exchange commodities and also a means to compare alternative uses of resources.

It differs from Marxist thought regarding the entrepreneurial surplus which according to Austrian thought is in no way exploitation of labour but a premium to the entrepreneur for forgoing present consumption for future consumption (labour is not the origin of value of the commodity). This result derives from the time preference theory which states that individuals when confronted with two goods qualitatively and quantitatively similar but in different time periods, the individual will prefer the good more near in time and therefore, choosing the more distant good necessitates the presence of interest. Also it maintains that inflation and business cycle fluctuations are a result of monetary policy actions which hamper the smooth functioning of the market economy by sending incorrect signals to the entrepreneur-producers regarding time preferences of the consumers.

Although the Austrian School has been considered heterodox since the late 1930s, it began to attract renewed academic and public interest starting in the 1970s. Economists have argued that the theories put forward are empirically not supported and therefore, the Austrian School has remained in the background.

Suggested reading: *Human Action* by Ludwig von Mises, *Founder of the Austrian School*.

Economists, Now and Then

This section tries to supplement the section on Schools of Economic Thought by describing the lives and achievements of some noted economists, belonging to different traditions and different generations. The descriptions are by no means exhaustive but primarily focus on the works that made them well-known.

Joseph E. Stiglitz and Information Economics

Daniel Ebor Challam, I Year

As a youngster, the concepts of poverty, discrimination and unemployment struck Stiglitz. He questioned their existence and what he could do about them. From 1960 to 1963, he pursued his undergraduate studies at Amherst- a liberal arts college, where he was actively involved with the debating society. This helped shape his interests in public policy. Even though he majored in Physics in his third year, he had an irresistible attraction towards Economics. So, he left Amherst and completed his fourth year of study from MIT, where he also pursued his graduate work.

Stiglitz has made many vital contributions to the field of Economics and has helped create a new branch of this discipline, The Economics of Information.

His technique of screening was one of his most famous offerings. For years, economists had been using models that assumed information was perfect. They hoped that a world with moderate imperfect information would be similar that with perfect information. However, this was not the case. Imperfect information does have profound effects on how the economy behaves. With the help of screening however, an economic agent was able to extract private information from another. This study earned Stiglitz the Nobel Memorial Prize in Economics in 2001 alongside George A. Akerlof and A. Michael Spence.

Stiglitz also did research on efficiency wages in 1984, and explained why there was unemployment even in equilibrium. Basically, wages serve two functions: allocating labour and providing incentives for employee effort conditional on employment. As is usually the case when one instrument is used to solve two problems, this was likely to lead to inefficient outcomes. Stiglitz provided a technical description of why wages are unlikely to fall and how involuntary unemployment appears. This model is known as the Shapiro-Stiglitz model named after its proposers, Stiglitz and Carl Shapiro.

Stiglitz has also made major contributions to macroeconomics and monetary theory, to development economics and trade theory, to public and corporate finance, to the theories of industrial organization and rural organization, and to the theories of welfare economics and of income and wealth distribution.

Currently, Stiglitz is a professor of Economics, Business and International Affairs at Columbia University, New York.

Joseph Schumpeter and Creative Destruction

R. Sharvari, I year

Joseph Alois Schumpeter was born in Triesch, Moravia, on February 8, 1883. As a law student at the University of Vienna, Schumpeter took courses in economics and participated in various seminars as well. He received his doctorate in 1906 and published his first book, Das Wesen und der Hauptinhalt der theoretischen Nationalökonomie (1908), a methodological treatise on economic theory.

Schumpeter was an encyclopedic scholar, with a stupendous knowledge in the history of economic thought. He highlighted the role of innovation for the performance of market capitalism. By innovation he meant the

introduction of new production technologies and new goods, the conquest of a new supply of raw materials, the setting up of new organizations of industries, and the opening up of new markets. For Schumpeter, entrepreneurial action conceived as innovation is the central feature of capitalism and it forms the backdrop to his theories of credit, interest, capital, profit, and the business cycle. In Schumpeter's scheme, the entrepreneur, as an agent of innovative change, is a revolutionary, overturning tried and tested ways, departing from routine, resisting inertia, and producing novelty by putting extant resources to new uses. The carrying out of new combinations in production is the essence of creative destruction a task accomplished by entrepreneurs. Thus, the term creative destruction was coined.

According to Schumpeter innovation is above all an act of will, depending on leadership, and should not be confused with scientific (or otherwise) invention. Schumpeter broke with tradition by denying that profit is a return to risk. Schumpeter argued that risk falls on the capitalist, not on the entrepreneur as entrepreneur, the latter as such being bereft of capital. All of this was discussed in his book Capitalism, Socialism and Democracy (1942). In recent decades Schumpeter's ideas on capitalism as a method of evolutionary change have instigated a renaissance in research on technological change led by economists, such as Richard N. Nelson and Sidney Winter, favoring an evolutionary approach to economics. Schumpeterian economics is one of the main sources of evolutionary economics.

Elinor Ostrom and the Free-Rider Problem

Anshul Jain, I year

Elinor Ostrom (August 7, 1933 – June 12, 2012) was an American Political Economist. She completed her PhD in Political Sciences from UCLA in 1965 and served as faculty for Indiana University and the Arizona State University. She is the only woman in history to have ever won a Nobel Prize in Economic Sciences. Her book *Governing The Commons* has been acclaimed as one of the most far-sighted and revolutionary works in the field of environmental resource management.

Her work has majorly been focused on providing alternative solutions to the prevention of reckless and exploitable usage of naturaresources. Resources such as land, forests, fisheries have been were termed Common-pool Resources in her study. Conventional practices to prevent over-exploitation and ensure replenishment of such resources include regulations by governmental agencies and/or privatization of such resources enabling limited use by individuals. But Ostrom writes a group of principals who are in an interdependent situation can organize and govern themselves to obtain continuing joint benefits when all face temptations to free-ride, shirk, or otherwise act opportunistically. Her works primarily based on examples from field studies in Switzerland, Japan, Spain, Philippines, parts of Africa and Nepal where societies, through the use of a polycentric approach and greater involvement of appropriators in the institutional management of such resources, have prevented ecosystem collapses and achieved a sustainable equilibrium as well.

Although her models have been criticized and debated against three dominant models – the tragedy of the commons; the prisoner's dilemma; the logic of collective action, Ostrom has suggested that her methods are very particular and require effective communication, internal trust and reciprocity for success. She concludes by saying if this study does nothing more than shatter the convictions of many policy analysts that the only way to solve common pool resource problems is for external authorities to impose full private property rights or centralized regulation, it will have accomplished one major purpose.

David Ricardo and Classical Economics

Swati K., I year

David Ricardo (18 April 1772 – 11 September 1823) was born in London to a Jewish family. His career began as a broker and financial speculator. At the age of 27, after reading Adam Smith's The Wealth of Nations, he got interested in economics and from then spent his life as a professional British Classical Economist. He wrote his first economics article The Price of Gold at the age of 37. One of his earliest works was the Theory of Comparative Advantage in favor of free trade and industry specialization. It states that a country that trades for products it can get at lower cost from another country is better off than if it had made the products at home. Like Adam Smith, Ricardo was an opponent of protectionism- the economic policy of restraining trade between countries. Among the famous laws of economics, Law of Diminishing Marginal Returns was formulated by Ricardo.

In his Principles of Political Economy and Taxation he states the Labour Theory of Value and Law of Rent. Another idea proposed was the Ricardian Equivalence- a government's choice of how to pay for its spending might have no effect on the economy though it fails to be true in practice. Ricardo was an early believer in the quantity theory of money (Monetarism). His famous works include the Principles of Political Economy and Taxation, Proposals for an Economical and Secure Currency, Letters of David Ricardo to Thomas Robert Malthus, etc. His ideas had a tremendous influence on later developments in economics. He had influenced Ricardian socialists, Karl Marx, Franz Oppenheimer and many others. As Keynes wrote, Ricardo conquered England as completely as the Holy Inquisition conquered Spain. David Ricardo gave his last fourteen years to economics during which he had gained a lot of fame and came to be known as the theoretical father of classical Political Economy.

Paul Samuelson and Economics-As-We-Know-It!

Janak Priyani, III year

Paul Samuelson is one of the most important persons in theorising economics. He was one of the greatest economists of the twentieth century, having an unmistakable contribution in giving a comprehensible mathematical shape to the economic theory. No doubt, that he is known as the Father of Modern Economics. In consumer theory, he pioneered the revealed preference theory, which is widely used in analyzing consumer behavior today. He left his mark on fields like public finance theory, international economics, finance theory, capital theory and welfare economics, to name a few. His book Foundations of Economic Analysis takes a much more pragmatic approach to Economic analysis and there is no better evidence of his ability to quantify theoretical concepts handsomely. He also introduced the now familiar concept of social welfare function enabling one to rank social outcomes which can also prove helpful from public policy point of view. In international trade, he proved the factor price equalization theorem, which says that because of international trade factor prices such as wage rate and rental rate of capital tend to equalize across trading nations (of course, with certain assumptions being satisfied) . In Macroeconomics, Samuelson demonstrated how combining the accelerator theory of investment with the Keynesian income determination model ex- plains the cyclical nature of business cycles. He was awarded the Nobel Prize for Economic Sciences for his immense contributions in analytical and methodological advancement in the field of economics.

University Calls!

The Editorial Board sent out requests to some of the old students of Ramjas pursuing their Masters Degree in various premier institutions in the country to describe their experiences there and help the outgoing batch to make better choices. Some of them readily agreed and shared their experiences with us. Ujjwal Umani talks about his experience at JNU while Aruna Arora and Raj Anmol Singh Garg talk about DSE.

Jawaharlal Nehru University

Central bank should follow a tight monetary policy to reduce interest rate. How would you react to this statement? Laugh, right? But, what if I say that this is straight from one of the celebrated papers of Milton Friedman? The very first lesson I learnt at JNU was not to reject any idea just because it was against my preconceived notions.

Having spent three years in a college adjacent to Delhi School of Economics, it was natural for me, as for many of my classmates, to dream about getting there. But fortunately, fate wanted it the other way. I took admission at the CESP (Centre for Economic Studies and Planning), JNU, obviously because I could not clear the DSE entrance. Everything is quite different here, be it the gender ratio (around three males for every thirteen females) which is quite unbelievable or the dominance of left wing politics in the campus.

The first Macroeconomics class of Prof. Prabhat Patnaik was also nothing less than different. He challenged all the ideas that had gradually settled in my mind in the three years of undergraduate studies and it was indeed tough to digest these ideas. As it happens, I started disliking the centre. But soon I realized that progress, particularly in economics and other subjects in general has been achieved only by challenging the settled ideas. Whether it was Keynes in the 1930s or Milton Friedman in 1950s or Paul Krugman now, each one of them had theorized against the main current of economic thought prevalent at the time of their thesis. This has become more important after the global financial crisis of 2008, after which the whole framework of analytical structure of mainstream economics is being questioned. One idea which is widespread among students, more in negative sense than positive, is that economics pedagogy at CESP is more theoretical than mathematical and so they prefer other centres of economics to JNU. I harboured the same view once. But it is not at all correct, neither that only Mathematical Economics can make you a good economist nor the fact that only theoretical courses are offered at CESP. Subjects like Game Theory, Econometrics, Social Choice, Law and Economics amongst others are offered as optional papers. While it is true that campus placement might not be as good as at other places but this should not be the only criterion to prefer any institute.

On the eve of celebration of 40 years of CESP, Deepak Mohanty, CESP alumni and executive director of the Reserve Bank of India said 'one stereotype was that the teaching in JNU has strong left orientation which could be a constraint in one's professional life. With the benefit of hindsight, seeing the way students have moved to diverse fields, I could say that the teaching provides ample flexibility for freedom of choice'. As far as pedagogy is concerned, faculties here will constantly push you towards original thinking rather than following the established line of thinking.

These two years have been a game changer in my life. Even at the risk of exaggeration, I would say that each and every student should stay at JNU for atleast some time and students of economics should come to CESP. Even if you do not learn too much *economics* (a situation I find myself in), it will teach you to challenge the widely accepted but logically inconsistent ideas. CESP will leave a mark on your personality that whenever and wherever you go, people will identify your alma-mater from the way you think and express.

I will end by posing a question to you, *does saving precedes investment or investment generates its own saving?* Thanks for giving me space!

Delhi School of Economics

Life at DSE is what you choose to make of it. Depending on your reasons for coming to DSE, it can either welcome you with open arms or strike terror in your heart. Not being judgemental, but hey, everyone cannot love Economics. If that is the case with you, do yourself a favour and stay away from this place. But in case you do love it, this place will be your temple for the next two years. Keeping the scintillating reputation and prestigious alumni base apart, D-School offers you the chance to develop yourself in ways you could not have thought possible.

While academics are, without doubt, the single most important aspect of DSE, what makes this place special for us is the brilliant faculty members we look up to and the passion they can bring to the most boring of courses. Each and every one professor is among the best in their field and can make your time at DSE the most fruitful one in your life. We say 'can' because the most any professor will do is to attempt giving you a flavour of the subject while leaving the rest (and most of the course you would be tested on!) to you to study. However, the fondest memory of DSE that we will carry with us is the incredible unity in our class of 230, the way we try to help each other in studies and tell each other 'this too shall pass' ,making us feel that someone has got our back.

As is inevitable, studying in one of the finest institutes of South Asia with some of the best budding economists and awe-inspiring faculty, not to mention the tremendous study load and perpetual exams, takes a toll on you. Sadness, anxiety and depression are the most common symptoms of DSE students, heightened astronomically during exams and shared near JP tea stall. In terms of marks, be prepared to deal with delayed gratification.

You might curse it, hate it, want to run away from it but when you leave DSE with your Masters degree, you are assured you can conquer anything in this whole wide world. Having passed from DSE, the probability is miniscule that you will ever find anything difficult. No pretence, it is hard but so is anything worth doing. We have thoroughly enjoyed our ups and learnt life lessons from our downs in DSE.

Good luck!

Developing multilateral hydropower trade in South Asian Growth Quadrangle: A game of trust dilemma and non-cooperation[1]

Simoni Jain, III year

The South Asian region, comprising India, Nepal, Bhutan and Bangladesh, is a fast developing region with growing energy demand. With large hydropower resources, the region has a high potential for multilateral hydropower trade for optimum utilisation of hydropower resources and building the energy base of the region. Though potentially beneficial, such multilateral trade has not been developed in the region yet. The paper aims to study the rationale behind multilateral energy trade in the region and highlight the impediments to such opportunities. As the region makes the case of political mistrust among the nations which is the major roadblock to achieving Pareto-optimal outcomes, the paper will employ game theoretic models of non-cooperative behaviour to study the strategies of the players involved. A two-player extensive game with imperfect information will be used to conclude that building trust is essential to achieve successful cooperation for Pareto-optimal outcome with respect to hydropower trade.

Introduction

South Asian Association for Regional Cooperation (SAARC), comprising India, Pakistan, Nepal, Bhutan, Bangladesh, Maldives, Sri Lanka and Afghanistan, is one of the fastest growing regions today- a growth spurred by correction of macroeconomic imbalances and gradual liberalization of the South Asian economies. The growth rate of South Asia averaged at 5.4 per cent in 2012 (World Bank, 2013). Though global integration has been focused for growth, this paper aims to study the benefits that will accrue to the region through regional integration and cooperation, with specific focus on the energy sector.

There is a direct causal link between increased energy supply and economic growth. Upward mobility on the social development scale further accentuates the demand for power. Poor-quality energy infrastructure is a major obstacle to the economic development of the region (World Bank, 1994). To sustain the economic growth, it is important to remove barriers imposed by lack of access to energy. This indicates the need for continuous and reliable energy supply among the fast growing SAARC nations.

Rapidly growing demand for power coupled with inadequate power supply is a major issue faced by the SAARC member states that currently face losses due to power shortages. Demand for power in India has been growing at a rate of 7.6% which suffered a shortage of 8.5% in energy and 10% in peaking power in 2011-2012 (CEA 2013). The economic costs that consumers and producers in the region are facing due to power outages are high.

With a growing need to meet the energy requirements of the region, Rahman, Wijayatunga, Gunatilake and Fernando (2011) laid down that SAARC member states need to ensure energy security, reduce the cost

1 This paper was presented in the session 'Cost of Economic Non-Cooperation to Consumers in South Asia' in the 11th South Asian Economics Student Meet, 2014, Bhutan, organised by the Royal Thimphu College, Bhutan. I am deeply indebted to Dr D.K. Das and Dr M. Pandey for giving me the opportunity to participate in the summit. I am also grateful to Mr A. Dash, Mr S. Kundu and Mr M. Joshi for their valuable insights and advice. The usual disclaimers apply. Please address any comments to simoni.jain82@gmail.com

of energy supplies and cushion themselves against possible oil price shocks. This can be ensured through increasing cooperation in regional energy trade and development of cross-border infrastructure. A regional group which fosters cooperation among member states for greater development, SAARC provides increased opportunities for optimum utilisation of resources beyond national boundaries, particularly under-utilized hydropower resources. The report identifies intra-regional trade in hydropower as a potential area of cooperation.

In the given context, the South Asian Growth Quadrangle (SAGQ) comprising of India, Bangladesh, Nepal and Bhutan has a resource potential and tremendous scope for energy cooperation in hydropower trade which can play a key role in addressing many of these energy security concerns and putting it on the path of sustainable development (Energy Sector Management Assistance Program and the South Asian Regional Energy Cooperation Program, World Bank 2008). However, cooperation record in the area has been limited to the basic form of cooperation i.e. bilateral agreements between countries, of which India-Bhutan trade arrangement in hydropower has been a success.

In the recent past, member states have shown an inclination towards the development of multilateral hydro energy trade relation. In India, the share of hydropower in energy sources has drastically fallen from 40% in 1970 to less than 25% in 2001, with growing dependence on thermal power. The government of India has been keen on developing the hydro-thermal mix to 40:60 (United States Agency for International Development under South Asia Regional Initiative for Energy, Nexant 2003)

This paper is concerned with regional cooperation in energy trade for optimum utilisation of hydropower, with reference to the four member states of South Asian Growth Quadrangle within SAARC. The objective of this paper is to highlight the opportunities for increasing multilateral energy trade, examine the factors which have inhibited such trade so far, take note of the emerging favourable scenario in the region and identify the means that are necessary to achieve Pareto-optimal solutions to energy crisis in the region.

The next section discusses the current energy scenario in the SAGQ. The third section makes an assessment of the rationale behind multilateral hydropower trade in the region and the benefits that will accrue thereof. The fourth section of the paper will provide a review of the water conflicts in the region and the geo-political issues that have hampered the growth of multilateral power trade in the region. In the last section, water conflicts will be modelled using game theory to understand the dynamics of the region and the strategic actions of the players involved will mirror the real world conflicts. For a Pareto-optimal solution to the problem of developing trade in hydropower resources, concepts of Nash equilibrium in non-cooperative games will be employed. The concluding section summarizes and concludes the findings, identifies the limitations and avenues for further research.

Current Energy Status in South Asian Growth Quadrangle

The SAARC sub-region comprising India, Bangladesh, Bhutan and Nepal is rich in energy resource endowment with wide variations among the nations, particularly in relation to thermal and hydropower resources. The skewed distribution of resources in the SAGQ is evident in Table 1. India and Pakistan have large reserves of coal and natural gas. Around 65% of total installed capacity of India is based on thermal power resources.

Though deficient in conventional energy sources, there is dominance of hydropower resources in Nepal and Bhutan and of natural gas in Bangladesh.

Table 1: Energy Resource Endowment of the Region

Country	Oil Reserves (mt)	Gas Reserves (bcm)	Coal Reserves (Gt)	Hydropower Potential (MW)
Bangladesh	7.8	580/810	2.2	755
Bhutan	0	0	0	23,760/30,000
India	786 (2005)	948	25/285	84,000/150,000
Nepal	0	0	Modest	43,000/83,000
Pakistan	105	1300/5700	185	54,000
Sri Lanka	14-18	0	0	9,100

Notes: (1) Under Oil and Gas reserves, proven / probable reserves are shown where available. Under hydro, economically viable potentials / technical potential are shown.

Source: World Bank, Sustainable Development Department, South Asia Region, June 2007 "Potential and Prospects of Regional Energy Trade in the South Asia Region". Page 19, Table 2.1

As apparent in the case of resource endowments, there are regional variations in energy consumption levels that range from 0.2 million metric tonnes of oil equivalent (MMTOE) in Bhutan to 423.20 MMTOE[2] in India (Country Reports, 2008). The demand for energy has been fast growing but the average per capita energy consumption levels in South Asia are much below the world average.

Though India has a huge coal reserve but it is insufficient to meet the demand of the growing population. Also, a large part of these reserves is of poor quality with high ash content and low calorific value. There is a shortage of gas supply. Thus, the resource base of the region is insufficient to meet the demand of the large area and population. 25 per cent of primary energy needs are met through imports. Even after accounting for natural resource endowments and imports, the state is projected to face 5.1 per cent of energy deficit in the current fiscal year, Central Electricity Authority (CEA, 2014). The report states that the projected shortage in the northern and north-eastern states is likely to be 3.4 and 17.4 per cent respectively, with shortages peaking during the dry months.

Bangladesh has low reserves of coal and oil, its main energy source being natural gas. A region with an annual average growth rate of around 5 per cent, Bangladesh provides access to electricity to around 59.60 per cent of the population as of 2011 (International Energy Agency, World Bank). As reported by CEA, per capita electricity consumption rates in Bangladesh average around 148.62 kWh per person, which is very low compared to international standards. Reliance on a single source of power, coupled with a dominance of non-commercial energy sources like fuel wood, animal waste and crop residue in the rural areas, accentuates the problem of energy crisis in Bangladesh.

2 The **tonne of oil equivalent** (**toe**) is a unit of energy defined as the amount of energy released by burning one tonne of crude oil. It is approximately 42 gigajoules or 11.63 Mega Watt Hour, although as different crude oils have different calorific values, the exact value is defined by convention

Bhutan's installed electricity generation capacity is about 400 MW of which about 97 per cent is hydroelectric and rest thermal. Installed hydropower capacity is mainly generated in the three plants- Chukka, Kurichhu and Tala. According to the report by United Nations Industrial Development Organization (UNIDO) and International Centre on Small Hydro Power (ICSHP) (2013), Bhutan's electrification rate remains at 60%, mainly due to lack of transmission and distribution facilities as Bhutan generates more electricity than it needs and exports the surplus, primarily to India.

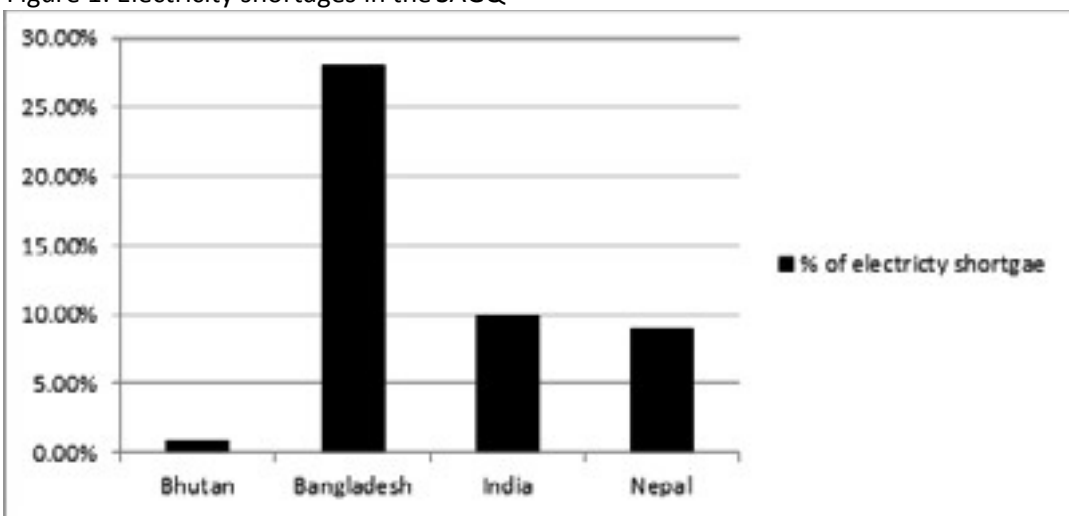
Nepal's electricity generation is dominated by hydropower though electricity fulfils only 1 per cent of energy need. Use of traditional means of energy is high with the share of fuel wood, agricultural waste and animal waste being 68, 15 and 8 per cent respectively (USAID SARI/EI, 2006). On the contrary, Nepal is blessed with an enormous hydropower potential of 83,000 MW, of which 42,000 MW is economically feasible. Having immense potential, it is important for Nepal to increase its dependence on electricity with hydropower development.

Sub-Regional Cooperation in SAAGQ and Rationale for Hydroenergy Trade

Given the energy resource endowments and consumption pattern in the SAGQ, a few points merit attention. Firstly, developing alternative sources of energy is required to diversify energy mix. Though on a regional level there are significant variations in energy mix, in terms of energy consumption pattern, there is a marked dominance of a single-energy source in SAGQ. Bangladesh's energy mix is dominated by natural gas (74%) while India is heavily dependent on coal (55%). Nepal and Bhutan have an overwhelming share of petroleum and hydroelectric power (around 90%) in their commercial energy consumption mix (Country Reports, 2008). This is a cause of concern for it not only limits the options of meeting diverse energy demands, but also increases energy security concerns. International Energy Agency (IEA 2008) projected the global primary energy demand to grow at 36 per cent from 2008 to 2035, of which developing economies, like India and China, will account for 90 per cent share. This will increase pressure on energy supplies, especially oil-pressure which is projected to push oil prices up by 50-100 per cent by 2030. Fluctuations in oil prices makes intra-regional energy trade in hydropower a safe and sustainable alternative.

Secondly, the region faces electricity shortages (Figure 1) which adversely affect the industrial productivity and growth. As noted earlier, India faced an energy and peak shortage of 8.8% and 12.2% in 2003-04. Khatib and Manasinghee (1992) estimated the cost of power shortage to India's and Pakistan's industrial sectors to be 1.5 and 1.8 per cent of GDP respectively. Nepal's industry loses 24.7 million dollars annually due to poor power quality. This accounts for 4.43% of industrial sector GDP or 0.47% of the national GDP. In Bangladesh, power outages approximately cost 1 billion dollars a year which reduces the annual GDP growth by half a percentage point (USAID-SARI/EI). Intra-regional energy trade can reduce the risk of power outages and peak shortages that presently arise in the SAGQ due to singular dependence on limited conventional energy sources.

Figure 1: Electricity shortages in the SAGQ



Note: Above data is for 2006/07 except for Bhutan for which data is for 2004/05

Source: Country Reports, Manila 2008

Thirdly, though economically beneficial, Nepal and Bhutan have failed to optimally utilize hydropower resources due to limited domestic demand and lack of financial investments for hydropower development, among other reasons (Nexant SARI/Energy 2002). Nepal's domestic demand for electricity fall short of its potential hydropower generation capacity and thus it needs to be harnessed for mutual benefits of the countries in the region, namely India and Bangladesh that face shortage, for optimum utilization. Out of 23760 MW of technically and economically feasible hydropower potential, Bhutan has only developed 4.96%. Bhutan already exports surplus power from its hydroelectric power plants to India after meeting its domestic demand. Thus, regional trade is inevitable to fully exploit the natural resources.

Also, hydropower development projects are capital intensive and require huge investments to exploit economies of scale. The relatively smaller economies, Nepal and Bhutan, have limited investable resources and require help from the neighbouring states in financing the project. Successful collaboration on this front was seen in construction of Chukka Hydroelectric Project (HEP) as a joint venture between India and Bhutan. The government of India agreed to finance the total cost of the project, giving 60% as grant and 40% as loan. Thus there is a need for cross-border collaborative investments as sharing costs and benefits of such huge plants eases immediate financing burdens and lowers project risks for individual countries.

SAARC Regional Energy Trade Report (2010) identified intra-regional energy trade in hydropower as a viable option for social and environmental benefits to SAARC member states. Rahman et al (2011) laid down the potential benefits that can be exploited from developing India-Nepal hydroelectricity trade due to variation in energy source and the seasonal variations in peak demand. Nepal has a hydro-dominated power system whereas India's is primarily thermal. With reduced local demand during the wet season (April-October) these hydropower plants generate surplus. The surplus energy can be exported to India to meet its acute power shortages during this peak season. During the dry season, Nepal's power shortage in excess of 100 MW could be met in part by imports from India. Currently, this trade is constrained due to lack of interconnections between the two countries. Similar opportunities of electricity trade lie between India-Bangladesh

due to daily and seasonal diversity in demand. The demand and supply variations among the nations in the SAGQ provide viable opportunities for multilateral trade to address peak shortage issues.

Lastly, hydropower energy development in the region would help mitigate climate change in the SAARC region. Regional projects are required for climate change mitigation as individual countries cannot achieve Pareto efficiency in the regional economy (Chakrabarti, 2010). Bhutan-India hydropower trade reduces coal power generation in India and helps mitigate climate change. This helped realize Clean Development Mechanism (CDM) benefits in 2010.

The rationale for multilateral energy trade thus lies in exploiting comparative advantages of the region to meet shortages of energy. Trade in goods and services in which the country has a relative comparative advantage is particularly important for growing economies. Bhutan is a case in point for it has moved to develop hydropower for export in exchange for other imports. This need is augmented by the very nature of developing economies. With an occupational shift away from agriculture to industrial and service sectors, electricity becomes an important input for growth.

Impediments to Mutually Beneficial Trade: A Case of Political Trust Deficit in the SAGQ

The region, though rich in hydropower resources, making multilateral cooperation for energy trade a viable and beneficial option, has failed to optimally utilize such opportunities in the past due to geo-political issues. Conflict over water resources and related issues has been a major roadblock in the South Asian region, be it between India- Bangladesh, India- Nepal or India- Pakistan. On one hand, the volatile political relations among the SAARC member states due to historical conflicts exacerbate the water issues in the region. On the other, water related issues lead to political conflicts that create an environment of mistrust in the region.

This section of the paper will study the contentious bilateral relations between India-Bangladesh and India-Nepal. A case in point is the development of hydropower trade between India and Bhutan. Political collaboration was a prerequisite to lay down agreeable terms of trade between the two nations for mutually beneficial bilateral cooperation.

Water issues between India and Nepal result from a lack of mutual understanding and cooperation. A highly contentious issue between India and Nepal is the Mahakali Treaty[3] (1996). Nepal hold the treaty to be unreasonably favouring India as it lacks a clear provision of what constitutes Nepal's water rights. India's dominant position fuels Nepal's mistrust as it perceives such agreements to be biased against its interests.

3 The Treaty on Integrated Development of Mahakali River was signed by the Prime Minister of His Majesty's Government of Nepal and the Prime Minister of the Government of India in February 1996 and which came into effect in June 1997. It concerns with the Integrated Development of the Mahakali (Sharda in India) River including Sharda Barrage (existing), Tanakpur Barrage (existing) and Pancheshwar Project (Proposed – under Planning). Pancheshwar Multipurpose Project (PMP) on the river Mahakali is the centrepiece of the Treaty.

4 The National Flood Control Policy in 1954 (following the disastrous floods of 1954 in a large part of the Kosi river basin) planned to control floods through a series of dams, embankments and river training works. The Kosi project was thus

The Kosi Agreement[4] (1954) also failed to deliver satisfactory results. In April 2008, there was a devastating flood in the Kosi region which resulted in casualties numbering to 3 million people in India and around 50000 people in Nepal. This resulted in deteriorating relations between the two nations for Nepal reasoned India's inability in maintaining the embankments of the barrage on the river as the reason for the disaster. Nepal also alleged India of not keeping up its commitment of providing compensation for the land acquired and damages done during the construction of the barrage.

Bangladesh, which shares fifty-four rivers with India as a lower riparian, has serious differences over sharing the waters of the Ganges since India's independence. This was inflamed by the construction of the Farakka barrage by India in 1951, to divert water from the Ganges to the Hooghly River in India. Though the barrage helped India in meeting its water needs for irrigation, Bangladesh complained of reduced flow of water in the region, which adversely affected its agricultural productivity and growth. It also had a negative impact on fishing and navigation in Bangladesh and bought unwanted salt deposits into farmland. Such environmental costs exacerbate the issue.

Although, Bangladesh and India signed a treaty[5] in 1996 to resolve the issue of the Ganges, the arrangement is deemed to be inadequate and unsatisfactory to Bangladesh. Bangladesh is suspicious of India's actions in the Ganga-Brahmaputra basin, as India exploits the upper-riparian state benefits, which creates negative externalities for Bangladesh. Indo-Bangladesh relationship is marred by the problems of illegal immigrants to India, insurgency operations, border demarcation issues, trade balance et cetera, which compounds the problem of resolutions on water issues. India demands an abatement of such issues before any negotiations on the water front.

The dispute between India and Bangladesh gains strategic importance because the disputed area lies near the India-China border. This draws attention to the geo-politics of the South Asian region as China's emergence as an alternative to India for trade and protection with other South Asian countries poses a direct potential threat to India's supremacy in the region, though a complete review of the growing influence of China in the South Asian region and reasons for proposed consequences is beyond the scope of this paper.

Appication of Game Theory to Understanding Water Conflicts in the South Asian Growth Quadrangle

Limited cooperation in the South Asian region in the field of energy trade, mainly in the form of bilateral trade arrangements between India-Bhutan, has been achieved till late, though the potential for energy trade and need for energy security in the region has been long recognized. This paper hypothesizes that the efforts in the South Asian region with respect to hydropower trade have been limited due to political conflicts and

conceptualized (based on investigations between 1946 to1955), in three continuous interlinked stages – the first was a barrage to anchor the river. The second part was to build embankments both below and above the barrage to hold the river within the defined channel. The third part envisaged a high multipurpose dam within Nepal at Barakshetra to provide a substantial flood cushion along with large irrigation and power benefits to both countries. This was followed by the Kosi Agreement between Nepal and India signed on 25 April 1954 and revised on 19 December 1966 to address Nepal's concerns. The Kosi High dam, the linchpin of the whole plan, for various political reasons has yet precluded any action for several years but has since been revived under a fresh agreement, in a modified form for further investigations and studies.

lack of trust between the nations. Under this assumption, the next section of the paper will study the potential for multilateral hydropower trade in the region to achieve Pareto-optimal outcomes using non-cooperative game theoretic models. The two games-theoretic models developed below, stag hunt and imperfect information non-cooperative game will use the concept of Nash equilibrium to model the behaviour of key players in the SAGQ.

To understand the behaviour of the involved players, it is important to emphasize the geo-political issues of the region. While Bhutan has proven the economic benefits of exporting hydroelectricity to India, the trade has not been developed on a multi-regional level yet which is of crucial importance to meet the energy needs of the region. Mired in internal political conflict and fragile relations with its southern neighbour, Nepal has been unable to develop its ample hydropower resources to sell to power- deficit nations of the region, namely India and Bangladesh. Bangladesh has been unable to develop energy trade relations with Nepal and Bhutan due to lack of cooperation from India, which gains strategic importance when the geography of the region is considered as Bangladesh is a lower riparian state in the SAGQ, where each player shares water resources with the others. Mutual suspicion between the two nations has been the impediment to multilateral energy trade.

Geo-politically, South-Asia has two important characteristics that influence intra-regional interactions. First, it is Indo-centric with India occupying a central position both geographically and in terms of socio-cultural continuities and economic infrastructure. Second, the asymmetry of power in the region result from hegemony of India which rests on dominance in terms of size, population, resource base, potential for economic development, military strength and viability of constitutional, political and administrative structures. These two factors make India the 'Big Brother' in the region. The case of mistrust among the players rests on this imbalance of geo-political power in the SAGQ, with India being economically and politically stronger than the other three. With the proposed energy trade, India will benefit due to increased productivity and higher growth if energy shortage is met but it will have to sacrifice its benefits of being the upper riparian state and ensure that the participating states are not left unsatisfied as in the past. This is important to build the pool of trust in the region so as to induce Pareto-optimal collusive behaviour among the states, as will be studied in the model. India will also require allowing cross-border transmission lines with Bangladesh. Bangladesh and Nepal will have to commit to increased border security in an effort to quell the insurgencies fomenting across the border.

The costs of cooperation will be high for India as it will require giving up on its hitherto water rights but non-cooperation will pose a threat to India's stronghold in the SAARC region which is important for trade development in the future. The benefit of combatting China's increasing influence on the South Asian countries if India cooperates has the potential of offsetting the costs. The payoff matrix in the game-theoretic model below will be constructed under the assumption of high costs for non-cooperation to India due to threat from China.

The Non-Cooperative Game Theoretic Models

Bardhan (1993) argues that although most models of water sharing conflicts are Prisoner Dilemma games

due to free-rider problems, sometimes a player might not be able to reach his optimal outcome on his own, by defaulting as a Prisoner's Dilemma game models. Under that condition a person cooperates when the other person cooperates and defects when the other defect. This is modelled as the Stag-Hunt game of assurance[6].

Similar to Prisoner's dilemma, Stag Hunt is a coordination game for in both the games the cooperative outcome is Pareto optimal, in the sense that no player can be made better off without making the others worse off, but the non-cooperative Pareto-inferior solution is the Nash equilibrium. But unlike Prisoner's Dilemma, it has no strictly dominant strategy and there are two Nash equilibria. In the Stag Hunt game, it pays for the player to do exactly as the other player. The game predicts that the dilemma might arise in case of a stag hunt game for players do not always cooperate to reach the only Pareto-optimal outcome (all cooperate to catch the stag which gives each the highest payoff). In the real world, players might choose not to cooperate due to lack of trust, which results in a Pareto inferior solution (each gets a hare whose value is less than the value of the stag's share a player might have got). The game thus becomes a Trust Dilemma game.

Sharing of hydro power resources among South Asian nations can be understood as a Stag Hunt game with n players. Multilateral cooperation among the member states will result in low-cost hydropower trade for the energy importing nation and revenue generation by optimum utilization of natural resources for the energy exporting nations. This is the strategy with the highest payoff for all the players (all cooperate to catch the stag). Instead, each will have to incur costs of non-cooperation as analysed above- the energy-deficit states will suffer productivity loss and the hydro-energy rich nations will not be in a position to utilize resources, resulting in a Pareto-inferior Nash equilibrium (all players defect to catch a hare). Thus, regional cooperation gives each player a higher payoff as acting independently is insufficient to meet the needs of growing nations. The worst outcome for each player is when he cooperates and the other player defects, resulting in losses due to unsatisfactory compensation and violation of terms of agreement, as seen in the case of India-Nepal and India-Bangladesh bilateral trade agreements in the past.

The two-player strategic game that corresponds to this specification is:

- Players India, Bangladesh. These two players play a crucial role in multilateral hydropower trade in the SAGQ for political rivalries between the two has hampered such cooperation in the past.
- Actions Each player's set of actions is (Cooperate, Don't Cooperate)
- Payoff Matrix Incorporating the preferences described above, highest number is assigned to the best outcome for each player with zero being the cost of cooperation when the other defects. The payoff matrix is shown in the following table.

5 In this game the players who are out hunting, can choose between catching a stag together and a hare individually. A stag has the highest payoff for all players (the value of a stag is equally divided among all players) but can only be hunted when all players cooperate. Instead, each can choose to hunt a hare on his own, which gives him a lower payoff. The worst case for any player is when he chooses to hunt a stag together (cooperation) and any one player defects and goes for a hare (defection).

Player 1 Player 2

	Cooperate	Don't cooperate
Cooperate	2,2	0,1
Don't Cooperate	1,0	1,1

As the payoff matrix shows, the Pareto-optimal outcome (Cooperate, Cooperate), which pays the highest payoff to both players is not the only Nash Equilibrium of the game. Due to mistrust and lack of cooperation, each player might choose to not cooperate and this results in the Pareto-inferior Nash Equilibrium (Don't Cooperate, Don't Cooperate). It is a Nash Equilibrium for no player has an incentive to deviate unless the other player deviated too, i.e., if Player 1 does not cooperate, it pays for Player 2 to not cooperate.

Like any two player Stag Hunt game, n-player Stag Hunt game also has two Nash equilibria: the action profile (Cooperate,……, Cooperate) in which each player cooperates for mutually beneficial energy trade and in which no player cooperates (Don't Cooperate,…….., Don't Cooperate) and the hydropower potential of the region is not exploited to meet the rising energy demands, leaving each nation to provide for electricity from other sources on a self-sufficient basis.

In such Trust Dilemma games, there are two Nash equilibria- Cooperative and Non- Cooperative. If there is complete understanding and mutual agreement between the two players, there is no risk of failed cooperation and the outcome of the game is the one with the highest payoff for both the players. However, with a history of failed cooperation and mistrust in the past, political conflicts make non-cooperation a risk free strategy and result in a Pareto-inferior outcome. Generally, there is no tendency to free ride in a Stag Hunt game, as the payoff of non-cooperation does not depend on what the other person does. Thus, it is only a matter of trusting the other player with his signals of cooperation. If an environment of trust is built, with negotiations, the Cooperative Nash Equilibrium can be achieved.

This brings us to the issue of building trust between nations, to achieve a Pareto optimal outcome. In the past, the political conflicts and mistrust among the member states has created an atmosphere of suspicion towards future negotiations. To incorporate such impediments to achieving the Pareto-optimal solution, two-player game theoretic model of non-cooperative behaviour can be developed.

The game can be modelled as a two-player sequential game with imperfect information in which Player 1's move is followed by a move of chance that selects a signal observed by Player 2. Player 2 observes the signal but not Player 1's action. The game can be described as

- *Players* The authorities of India and Bangladesh
- *Actions* India is the first player. Actions available to Player 1 are (Cooperate, Don't Cooperate). Player 2 is Bangladesh. Player 2 does not observe the action played by Player 1 but only observes the signal. The actions available to Player 2 at the second node are (Sign, Don't Sign). The action

available to Player 1, India, is with respect to cooperating for mutually agreeable terms of trade with the weaker states, in this case Bangladesh, and not cooperating so as to exploit the benefits of upper riparian state, thus harming the weaker state. The action available to Player 2, Bangladesh, is with respect to signing up as a party to multilateral energy trade agreement in the SAGQ.

- *Preferences* The payoffs for the two players are calculated under the same assumptions as in the Stag-Hunt game. The assumptions are that the cost of non-availability of power is the highest to India. If India cooperates, it has to give Bangladesh rights over the use of water and sacrifice upper-riparian state benefits. In case of non-cooperation, the only threat that India faces is the emergence of China as an alternative to India for trade and protection among other South Asian countries. Such diplomatic ties could pose a threat to India's regional supremacy. Thus, Player 1 prefers to not cooperate and get the arrangement accepted by Player 2 (DC, S) than to cooperate and get the deal signed (C, S) as the cost of cooperation is higher than non-cooperation. In case Player 2 does not sign the deal, it is better for Player 1 to not cooperate and maintain its status as the upper-riparian state (DC,DS) than to cooperate (C,DS)

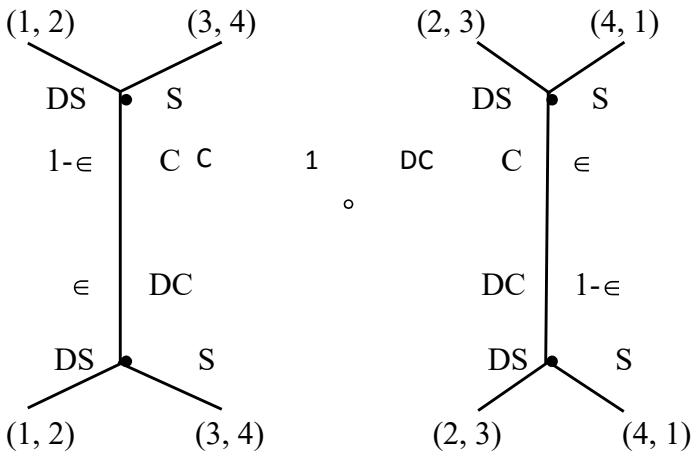
  In case of Bangladesh, the most preferred outcome is to accept the arrangement only when India cooperates (C, S). The worst case scenario is that it signs the deal and India does not cooperate (DC,S) since then Bangladesh will have to suffer huge economic and environmental costs at the hands of a selfish upper riparian state, India. It is preferred to not sign when India does not cooperate (DC, DS) than to not sign when it cooperates (C, DS)

- *Payoffs* The following table, which specifies the outcome with the first entry being the action played by Player 1 and the second entry being the action played by Player 2, lays down the payoffs for the two players. The ranking is such that the highest number is accorded to the most preferred outcome.

Outcome	India	Bangladesh
Don't Cooperate, Sign	4	1
Cooperate, Sign	3	4
Don't Cooperate, Don't Sign	2	3
Cooperate, Don't Sign	1	2

Assume that the probability that the signal is correct is the same for both actions and it is less than 1. Denote this by $1-\in$. Thus, if Player 1 chooses Cooperate (C), the signal is C with probability $1-\in$ and Don't Cooperate (DC) with probability $\in$, and if Player 1 chooses DC, it is DC with probability $1-\in$ and C with probability $\in$. The action Sign is denoted by S and Don't Sign by DS. The extensive form of the game and its strategic form are shown in Figure 4. Note, the strategy IJ of Player 2, where I and J are both either Sign (S) or Don't Sign (DS) means choose I after the signal Cooperate (C) and J after the signal Don't Cooperate (DC).

Extensive form of the game:



Strategic form of the game:

Player 1 /Player 2

	Sign, Sign (S,S)	Sign, Don't Sign (S, DS)	Don't Sign, Sign (DS, S)	Don't Sign, Don't Sign (DS,DS)
Cooperate (C)	3,4	3-2∈, 4-2∈	1+2∈, 2+2∈	1,2
Don't Cooper-ate (DC)	4,1	2+2∈, 3-2∈	4-2∈, 2∈+1	2,3

Assuming that $0 \leq \in < 1/4$, the payoff matrix can be constructed as given:

	Sign, Sign (S,S)	Sign, Don't Sign (S,DS)	Don't Sign, Sign (DS,S)	Don't Sign, Don't Sign (DS,DS)
Cooperate (C)	3,4	$2.5<x\leq3$, $3.5<y\leq4$	$2\leq x<2.5$, $2\leq y<2.5$	1,2
Don't Cooperate (DC)	4,1	$1\leq x<2.5$, $2.5<y\leq3$	$2.5<x\leq4$, $1\leq y<1.5$	2,3

Figure 3

From the payoff matrix in Figure 3, it can be concluded that [Cooperate, (Sign, Don't Sign)] is a pure strategy Nash equilibrium only if $\in=0$. This is the sub-game perfect Nash Equilibrium in case of an extensive game with perfect information. The pareto-optimal outcome of cooperation can be achieved only if Player 2 believes that the signals given by Player 1 can be fully trusted. If Player 1 plays Cooperate, then Player 2 observes the signal with probability 1 and plays his sub-game perfect strategy- Sign if Player 1 plays Cooperate and Don't Sign if Player 2 plays Don't Cooperate. This Nash equilibrium is Pareto efficient for no player can be made better off without making the other one worse off.

[Don't Cooperate, (Don't Sign, Don't Sign)] is a Nash equilibrium for all values of $0\leq\in<1/4$. Thus, the game in which Player 1's action is observable with an error has a Nash Equilibrium in which the outcome is that player 1 does not cooperate and player 2 does not sign, if the probability of error lies between [0,1/4). The outcome is Pareto-inferior for one player can be made better off without making the other worse off. In fact, for all vales of $0\leq\in<1/4$, both players can be made better off by deviating to [C, (S, S)].

Therefore, the advantage gained by the commitment entailed in being the first mover, as reflected in the sub-game perfect Nash Equilibrium of the game with perfect information, is lost when the first mover's action is imperfect. It is only when Player 2 fully trusts the signal given by Player 1 that a Pareto-efficient outcome can be achieved as a Nash equilibrium.

Conclusion

The need to develop energy security in the South Asian region highlights the importance of exploiting regional opportunities and benefits from multilateral energy trade in hydropower. Regional cooperation can lead to mutually beneficial trade as large scale regional projects can be developed to achieve economies of scale. Diversity of national endowments within the region presents a unique opportunity for energy trade for the common benefit of all. Interconnections open export opportunities for countries that hold a comparative advantage in hydro-power supply and energy deficit regions can meet their peak seasonal demands, saving on the losses that arise due to load shedding and power shortage. As laid down by the game theoretic models employed in the paper, cooperation can lead to pareto-optimal outcomes in the region and there is a need to build an atmosphere of trust and mutual agreement to reap the benefits. It is only when political ties improve that the weaker states will join hands for mutually beneficial trade in the South Asian Growth Quadrangle. Building cooperation within the region with improved commitment for mutually agreeable terms of trade is imminent for India against growing interest of China in the economies of South Asia, for it poses a threat to its supremacy in the region. A complete analysis of India-China relations and dynamics of increasing influ-

encing of China on the weaker states in the South Asian region is beyond the scope of the paper and requires further research.

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An Overview of Rural Healthcare in India[1]

Simran Lekhi, Pranjal Seth, Ayushi Choudhary, I year

The aim of the research is to provide an overview of health care in India with an emphasis on rural areas. The authors will explore the current state of healthcare and its shortcomings while educating the reader about the government run schemes, their positive influence on society and the problems they encounter in today's context along with possible solutions. The authors will also examine the peripheral factors affecting public health such as poverty and malnutrition and acclimatise the reader with existing government programmes pertaining to these factors as well as their problems. This analysis is based on the perusal of a bevy of secondary data that has been collected from various sources.

Introduction

India is a massive country which boasts of a complex and integrated system of health care, according to recent data released by the WHO, India's health sector ranks 112th in the world. Existing surveys paint a dreary picture, showing that 70% of Indians have limited or no access to health-care. Moreover, 95% of the population is not covered by proper health insurance, while 25% fall below poverty line in an effort to cover expenses. Hospitalized Indians, spend on an average 58% of their annual income on health care expenditure. 40% borrow heavily, or sell assets (National Institute of Rural Development & Panchayati Raj, 2005).

It is alarming that curative services are in favor of the richer population. Expenditure on the richest 20% of India is three times as compared to that on the poorest 20%. India spends only 1.3% of its GDP on health care. Health care in India is divided into three sectors. Primary health care, secondary Health care and Tertiary health care.

In addition to these three tiers, the Government implements various policy measures and schemes in order to alleviate the inadequacies in terms of provision of nutrition to the masses. Considering that 72% of the country's population belongs to the rural community which faces severe problems in accessing basic health facilities, the focus of our study will be primary health care.

Primary Health Care

The declaration of the international conference on Primary Health care held in Alma Ata, Kazakhstan in 1978 provides a scientifically sound and universally acceptable system of health care to a community. The conference urged governments, WHO, UNICEF and non-government organizations to indite national policies, strategies and plans of action in hope of launching Primary Health Care as a part of the national health system.

In rural India Primary Health Care is provided by integrating Primary Health Centres and Sub-Centres through multipurpose health workers, health guides and trained dais.

Primary Health Care includes the following elements:

1. Providing information regarding prevailing health problems and the methods of preventive as well as curative medication

2. Promotion of food supply and proper nutrition.

1 We extend our heartfelt gratitude towards our Economics Professor Mr. Alok Dash who has been a constant source of inspiration for us. We would also like to thank Mr Abhinav Kumar and Mr Alok Kumar Singh, two MBBS graduates who devoted their time, reiterating their first hand experience with the Rural Health Sector. Mr. Arvind Kumar, Principal Secretary, Medical Health and Family Welfare, UP Government, has been consistently supportive of the project and his inputs have been priceless. And last but not the least, Ms. Arshiya Lekhi, our patient and invaluable beta.

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3. Adequate supply of clean water and provision of basic sanitation

4. Emphasis on maternal and child health care, including family planning.

5. Immunization against major infectious diseases and curbing locally endemic diseases.

6. Provision of essential drugs.

Primary Health Care is essentially a three tier system based upon the following population norms:
Table-1: Population norms

CENTRE	PLAIN AREA	HILLY/TRIBAL/DIFFICULT AREA
Sub-Centre	5,000	3000
Primary Health Centre	30,000	20,000
Community Health Centre	1,20,000	80,000

(Statistics Division, Ministry of Health and Family Welfare, Government of India, 2012).

Sub-Centre- The Sub-Centre is the peripheral outpost of the existing health care system in the country. It is the first contact point between the primary health care and the community. Each Sub-Centre is required to be manned by at least one Auxiliary Nurse Midwife (ANM) and one Male Health Worker. These centres provide basic services viz- immunisation, pre-natal and post-natal care, prevention of malnutrition and common childhood diseases, family planning services and counseling. As of March 2012, there are 1,48,366 Sub-Centres functioning in the country.

Primary Health Centre- PHC is the first point of contact between the village community and the Medical Officer (MO). These centres are established and maintained by the State Governments under the Minimum Needs Programme (MNP). Each PHC requires at least one MO and 14 paramedic staff. With 4-6 beds for patients, PHCs act as a referral unit for 6 Sub-Centres. Preventive, curative and Family Welfare Services are some of the numerous tasks assigned to these centres. As of March 2012, there were 24,049 PHCs functioning in the country.

Community Health Centres (CHC)- Establishment and maintenance of CHCs come under the ambit of State Government (MNP). According to the norms, a CHC ought to be manned by 4 medical specialists viz. surgeon, physician, gynecologist and paediatrician coupled with 21 paramedical and other staff. A CHC comprises 30 in-door beds along with one OT, X-Ray, Labour Room and laboratory facilities. It serves as referral centre for 4 PHCs. As of March 2012, there were 4,833 CHCs functioning in the country.

Problems

The Primary Health Sector is crippled by the lack of awareness among the intended beeficiaries regarding the services available in the government health facilities. Apart from that, the system is still inaccessible to people residing in remote areas with arduous terrain. Many try performing the procedure themselves, which results in severe bodily harm. There is a shoage of ambulances to transfer patients from PHCs to CHCs. From the funding now available nder National Health Mission, many States have operationalized centralized call centre based ambulance services. While this has curtailed Out of Pocket Expenses (OOPE), many States remain where these services are yet to take off.

Often people arrive at the centres in the hope of availing the so-called procurable medical amenities only to discover that the building is non-existent. Hence these people either visit the urban setups, thereby further exacerbating the overburdened condition of the hospitals or resort to witchcraft and hermits. A mere 0.5% of rural poor avail basic sanitation facilities. There is a dearth of health workers manning various PHCs and CHCs spread across the canvas of the country. Frequent load shedding is yet another factor which adds to the miseries of these centres.

The sector is plagued by rampant corruption at each level. In addition, the conflict between traditional values and modern science is a major deterrent in ensuring proper dissemination of health care facilities. Absence of doctors emerges as one of the most distressing problems in the system. With the doctor-population ratio of mere 0.7 per 1000 persons (as of 2014, according to WHO), there is a desperate need for more doctors to be involved in the rural health care system. According to the Ministry of Health and Family Welfare, as of March 2012, out of sanctioned posts, 51.8% of surgeons, 40.7% of Obstetricians and Gynaecologists, 53.3% of Physicians and 43.1% of Paediatricians were vacant. When compared to existing infrastructure, there was a shortfall (difference between required number and the number in position) of 69.7% of specialists at CHCs.

Within PHCs, there is a shortfall of 38.2% in the position of Lady Health Visitors (LHV), and 52.6% in case of Male Health Assistants (HAM). There is a shortfall of 10.3% of the total requirement of allopathic doctors where 31.7% of LHV, 34.4% of HAM and 20.4% of sanctioned posts were vacant.
Moreover, at the Sub-Centre level there is a 3.8% shortfall in posts of Female Health Workers (HWF)/ Auxiliary Nurse Midwives (ANM) and a 65.2% shortfall in the posts of Male Health Workers (HWM).
4.0% of PHCs were without a doctor, 36.5% were without a Lab technician and 23.1% were without a pharmacist according to the report.

National Health Mission

Started in April 2005, *NHM aims* ***to*** *make the public health delivery system fully functional and accountable to the community, human resource management, decentralization, rigorous monitoring & evaluation against standards, convergence of health and related programs from village level upwards, innovations and flexible financing and also interventions for improving the health indicators*.

National Rural Health Mission

The National Rural Health mission (NRHM) was launched by the Prime Minister on 12th April 2005, to provide accessible, affordable and quality health care to the rural population. The Mission is an articulation of the commitment of the Government to raise public spending on Health to 2-3% of GDP.

The following are some of the major initiatives of the National Rural Health Mission. Accredited Social Health Activist (ASHA) are female community health workers (educated till grade 10 or more), who serve as a link between the community and the health system. The ASHAs receive performance-based incentives for promoting universal immunization, referral and escort services for Reproductive & Child Health (RCH) and other healthcare programmes, and construction of household toilets.

Janani Suraksha Yojana is a demand promotion scheme launched in April 2005 which aims to bring pregnant women to health facilities for ensuring safe delivery and emergency obstetric care. This scheme provides basic training to local untrained midwives to improve their knowledge in the elementary concepts of maternal and child health care and sterilization.

Janani Sishu Suraksha Karyakram entitles all pregnant women delivering in public health institutions to absolutely free and no expense delivery, including caesarean section. This initiative also provides for free

transport from home to institution, between facilities in case of a referral and ride back home. In 2013, the scheme was expanded to cover complications during antenatal, post-natal period and sick infants up to 1 year of age.

Rogi Kalyan Samiti (Ministry of Public Health & Family Welfare, 2015) is a management structure. This committee acts as a group of trustees for the hospital to manage the affairs of the hospital. RKS is free to prescribe, generate and use the funds it has as per its best judgement for smooth functioning and maintenance of the quality of services for patient welfare. While this scheme was implemented in Madhya Pradesh, it is under consideration in other states.

Despite the prevalence of the schemes, there are some major shortcomings of NHRM. A major problem that has been encountered is that existing laws do not allow AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy) doctors, with years of experience and dedication to their work, to prescribe the most basic allopathic medicines, even though pharmacology is taught to a certain extent as part of their curriculum. This is a major deterrent in prescription of allopathic medication as a supplement or an alternative to the AYUSH medication.

Often ASHAs are perceived as unwelcome and alien entities, which restricts their contribution to the community. They are often mistreated by medical personnel. Upper caste households undermine the capability and knowledge of SC/ST ASHAs. Moreover, several ASHAs find the nominal honorarium discouraging (Times of India, 2014) as they consider their roles as activists their sole source of income. Each individual initiative has its own constraints, for instance the selection process of ASHA is rigorous and time consuming.

Public Distribution System

Public Distribution System (PDS) is a government sponsored chain of shops entrusted with the prime objective of distribution of essential commodities (wheat, rice, kerosene, sugar et al) to the needy sections of society at affordable prices. The scheme is implemented by Food Corporation of India and comes under the purview of Department of Food and Public Distribution.

The scheme along with fair and equitable distribution of food grains and other essential commodities, attempts to put an indirect check on open market prices of various items. The Central Government is responsible for the procurement, storage, transportation, bulk allocation of food grains and maintenance of buffer stock while identification of families below poverty line, issue of ration cards, supervision and monitoring the functioning of FPSs come under the ambit of State Government.

The beneficiaries are divided into four categories namely- Above Poverty Line (APL), Below Poverty Line (BPL), Antyodya Anna Yojna which targets the poorest of the poor BPL families and Annapurna Scheme wherein 10 kg of food is distributed per month to indigent citizens aged 65 years and above.

There are several challenges before the Public distribution system in India. Fake ration cards are circulated and in many cases, the food does not reach the intended beneficiaries due to incorrect categorization. Some of the officials sell the fresh stock at market prices and distribute the below par grains among the ration card holders. The system fails to enroll a significant proportion of BPL families.

Supplied food grain is often contaminated or of subpar quality and many of the FPS shops are irregular. Delayed procurement, pilferage and immense wastage of food grains aggravate the problems of malnutrition and starvation (Pai, 2013).

Integrated Child Development Services (ICDS)

ICDS is India's flagship social welfare scheme to tackle malnutrition and diseases in children below 6 years

of age and their mothers. The scheme provides 300 kilocalories every day to every child aged 6 years and below and up to 500 kilocalories with up to 25g of protein to adolescent girls everyday. The scheme is mainly implemented through Anganwadi centres (a child-care and development centre) and is operated through the association of 25 lakh AWWs (Anganwadi Workers and Anganwadi helpers (AWHs) along with ASHAs, ANMs, teachers and women.

The Services it offers are supplementary nutrition, preschool non-formal education, nutritional and health education. It also provides Immunization, health-check up and referral services which are delivered through health Sub-Centres, PHCs and CHCs operating under MOHFW. The aforementioned services help in attainment of numerous objectives. They lead to a reduction in the incidence of mortality, morbidity, malnutrition and school dropout rates.

In recent years, it has been observed that there has been a marked improvement in various Health Indicators pertaining to children below the age of 6.

Unfortunately, the scheme is still plagued by some *issues*. Most of the Anganwadi Centres (AWCs) are in shambles with crumbling walls, open ceilings and absence of lavatories and insufficient space within the premises for conducting indoor and outdoor activities. Existence of various myths and taboos interrupt the process of immunization. Although children of age group 0-3 years are the most susceptible to a multiplicity of illnesses (Anaemia, Vitamin-A deficiency, stunted growth), special focus is placed on children of age group 4-6 years (Ministry of Women and Child Development, 2014).

Mid Day Meal Scheme

The National Programme for Nutritional Support to Primary Education relaunched in 2004 as Mid day Meal Scheme (MDMS) was launched by Government Of India in 1995. MDMS covered 7.18 crore primary school children and 3.36 crore upper primary school children in 2010-11. (Ministry of Human Resource Development, 2015)

The programme fulfills many purposes. It guarantees healthy growth of children by maintaining a constant supply of supplementary nutrition and helps eliminate classroom hunger. Most children attend school with an empty stomach which affects their ability to concentrate and hampers the learning process, issues which a midday meal can help children overcome. The programme leads to an increase in school participation both in terms of regularity of current pupils and increase in the number of children enrolled. It also helps enhance gender equity by providing an additional source of employment for women and allowing them to become independent. There exists a comprehensive mechanism for effective evaluation and transparency to enable accurate monitoring of the programme prescribed by department of school education and literacy, MHRD

The programme also faces certain shortcomings. The midday meals offer insufficient nutrition and the quality of food is unreliable at times. Long supply chain causes some of the food grain to become adulterated and pilfered hence making it unfit for consumption. Lack of awareness in many districts as well as misconceptions regarding the hygiene level of meals served under the scheme exist(which can be attributed to the Bihar midday meal tragedy wherein 23 children died due to pesticide poisoning and several other incidents of the sort) (The Times of India, 2013).In an evaluation study conducted by Planning Commission, it was discovered that in most of the states(9 out of 17 sample States) children are engaged in performing daily chores such as washing utensils while teachers are responsible for the provision, cooking and serving of the midday meals consequently leading to diversion from their regular duties as a teacher.

Solutions

There is an urgent requirement to train more health professionals so as to cater to the ever-increasing needs of the rural population. In order to improve the dismal doctor-patient ratio, new certificate courses for MBBS graduates ought to be introduced along with B.Sc. courses in rural health care (Nandan, Nair

and Datta, 2007). Medical graduates should be trained in close proximity to the PHCs so as to acclimatise them to the rural scenario. There is an immediate need to open B.Sc and M.Sc nursing colleges for efficient training of LHVs and ANMs. To encourage specialists to operate in rural areas, Government must provide monetary and non-monetary incentives such as advanced infrastructure facilities, suitable accommodation, extension of retirement age from 60 to 65 years and an enhanced salary structure.

Awareness among rural population about the benefits derived from enrolment in the various schemes needs to be spread and misconceptions about irrational beliefs regarding various health guidelines need to be dispelled. Enhanced monitoring parameters must be incorporated in the vigilance of the various poverty schemes to enable effective implementation.

AYUSH forms an integral part of the Indian health care system. As it follows the local health traditions, AYUSH practitioners are well versed with making use of materials easily available in the environment for the purpose of treatment. An effort is being made to integrate AYUSH into mainstream health care by allowing them to sit in government health care facilities within the same complex as allopathic doctors.

Towards Universal Health Coverage

In September 2014, the Government of India announced a new scheme, the National Health Assurance Mission (NHAM) in an effort to further reduce out of pocket expenses, and modify the existing Rashtriya Swasthya Bima Yojana (beneficiaries under which are entitled to hospitalization coverage up to Rs. 30,000 for most of the diseases that require hospitalization) which currently covers only BPL families, to expand its plan to include universal coverage. In the current fiscal year, the union budget allocated Rs 307.1 Billion (USD 5 billion) to health care. The NHAM will cost a whopping Rs 1.6 Trillion (USD 26 Billion) over the period of the next four years (Kalra, 2014).It will also attempt to empower the beneficiaries to choose from alternatives like Ayurveda.

With so many issues to be addressed as pointed out in our research and a demanding budgetary requirement for assuring health care as envisaged under NHAM, it remains to be seen whether such an assurance regarding health care can be given. Any such assurance, if given by the Government, will drive people to courts to get it enforced. The government should first resolve basic issues before creating any entitlements in health care, which it may not be able to enforce.

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Patterns In The Reasons Behind Household Savings
An investigation into the impact of the developmental level of settlement of households on shaping patterns in the reasons for which households save[1]

Anna Sinha & Shashank Sagar, II year

Savings are an important economic decision. Much research has been done over how savings impact the consumption levels of individual households and go on to have major ramifications on national income and related variables. This paper tries to the psychology behind this decision of saving and the reasons due to which people save. The paper tries to ascertain whether the reasons exist in isolation of the environment of the individual decision maker or whether they are impacted by their developmental level of settlement, or are distinct patterns formed in the same.

Introduction

This research paper is a part of the larger research project which deals with the impact of Income-levels, Occupation of earners and Gender of Earners; apart from the developmental level of settlement; on the Reasons due to which they save. The larger research project was conceived to be investigative in nature. This part of our research deals singularly with our first formulated question: Does the area of settlement, for example a Rural Centre[1], a Semi-Urban Centre[2], an Urban Centre[3] or a Metropolitan Centre[4], cause the formation of any pattern with respect to the reasons due to which Households save?[2]

Very little research has been done in this regard and we felt this is an area which should be studied not merely for interest, but also to understand better the distinct nature and profile of different households around us.

Methodology

The source of data for analysis in this research is purely primary data collected via a survey questionnaire designed by the authors.

The survey was to be conducted the months of September and October, 2013 in the four levels of settlements: Rural Centre[1], Semi-Urban centre[2], Urban Centre[3] and Metropolitan Centre[4].

Kahariya, a village in Bihar, was chosen to be the survey location as a Rural Centre. Hisua, a town in Bihar, was chosen to be the survey location as a Semi-Urban Centre. This area has a population of about 32,585 (male-52% & female-48%). Total no of wards is 17. Survey conducted in ward no-5, with 464 households and the population of 2822. Nawada, a district centre in Bihar, was chosen to be the survey location as an Urban

1 We would like to thank the Economics Department, Ramjas College for selecting this idea for funding via its Annual Research Project Funding program. We are gratified by the entire faculty for showing kind interest especially in extending this Research project. Although our teammate, Arnav Sharma left to join NDA in the very beginning of this project, we are ever grateful to him for helping us formulate the idea of this project. Please address any comments to annasinha95@gmail.com or shashanksagar28@gmail.com

2 Rural centre is a settlement with a population less than 10,000. Semi-Urban centre is a settlement with a population of 10,000 and above and less than 1 lakh. Urban Centre is a settlement with a population of 1 lakh and above and less than 10 lakhs. Metropolitan centre is a settlement with a population of more than 10 lakhs

Centre. This area has a population of about 98,029 (male-52% & female- 48%). Literacy rate is 70%. Total no of wards was 33. Survey conducted in ward no-13, with 501 households and the population of 3036. Delhi was chosen to be the survey location as a Metropolitan Centre. The survey was conducted in Jawaharlal Nehru University, Munirka and Vasant Kunj of Southern Delhi.

45 Data points from each of these locations were collected.

To ensure objectivity and representative data colection, every 5th house from the one surveyed was surveyed.

Reasons for choosing the above Survey Locations

1. The first reason for choosing these particular locations to conduct the survey was that they fulfilled the criteria of having a distinctive level of development and hence ensured that the data collected and analysed from these different locations are indeed representative of the many more such Rural, Semi-Urban, Urban and Metropolitan centres in India.

2. While one of the authors belonged to Bihar and one to Delhi, it was more convenient for them to conduct surveys in locations within their state as compared to alien locations.

Further, many questions in the questionnaire were sensitive in nature such that respondents might feel reluctant in answering them. For example, questions about the exact figure of the income of households, exact amount of money saved etc. Respondents would feel much more comfortable responding to people who they know and who speak in their own tongue. This also might ensure that authentic data which is nearest to truth is recorded during the surveys.

Problems Faced during Data Collection

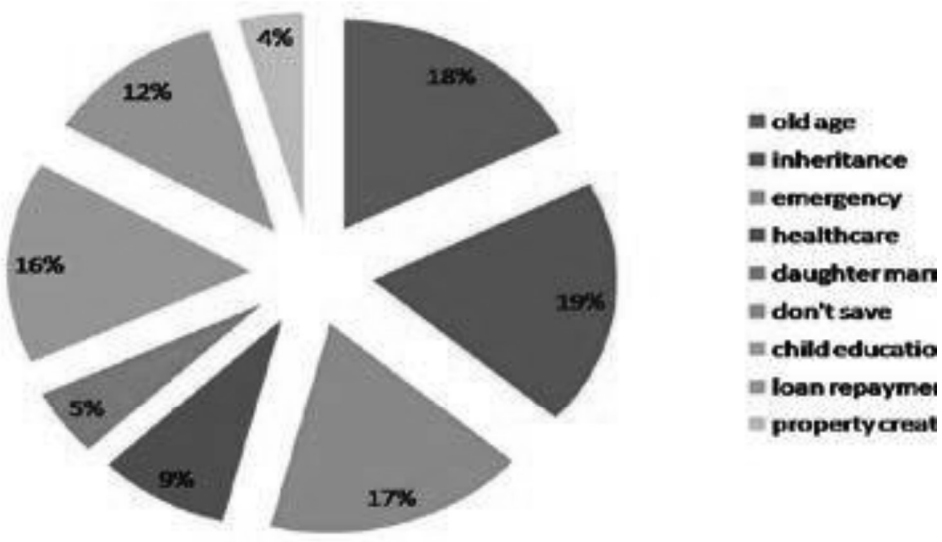
Inspite of our utmost efforts, some respondents remained apprehensive about the authors being Income Tax agents, and hence showed a lot of reluctance in coming out with the data.

Mostly in the Metropolitan and Urban centres the respondents took the questionnaire and asked the authors to take it later from them after it was filled. However, many households returned half-filled questionnaires which led to some data wastage.

Getting the respondents to answer the questions truthfully was indeed a big task.

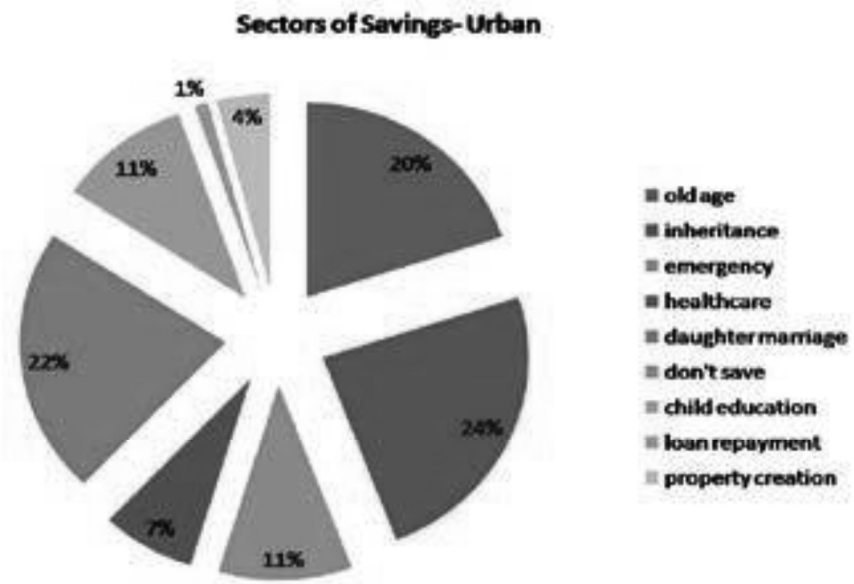
Region-wise Observations

Metropolitan Centre



Savings for passing on as Inheritance, Old Age, and Emergency clearly are the top reasons to save with 19% of the surveyed households saving for passing on as inheritance, 18% for their Old Age and 17% of households saving for Emergency.Savings for children's education follows closely behind with 16% of all households saving for it, followed by 12% of households saving for Loan Repayment, while only 9% of all households save for Healthcare.Savings for Daughter's marriage and Property Creation take the lowest priorities with only 5% and 4% of all households saving for these reasons.

Urban Centre

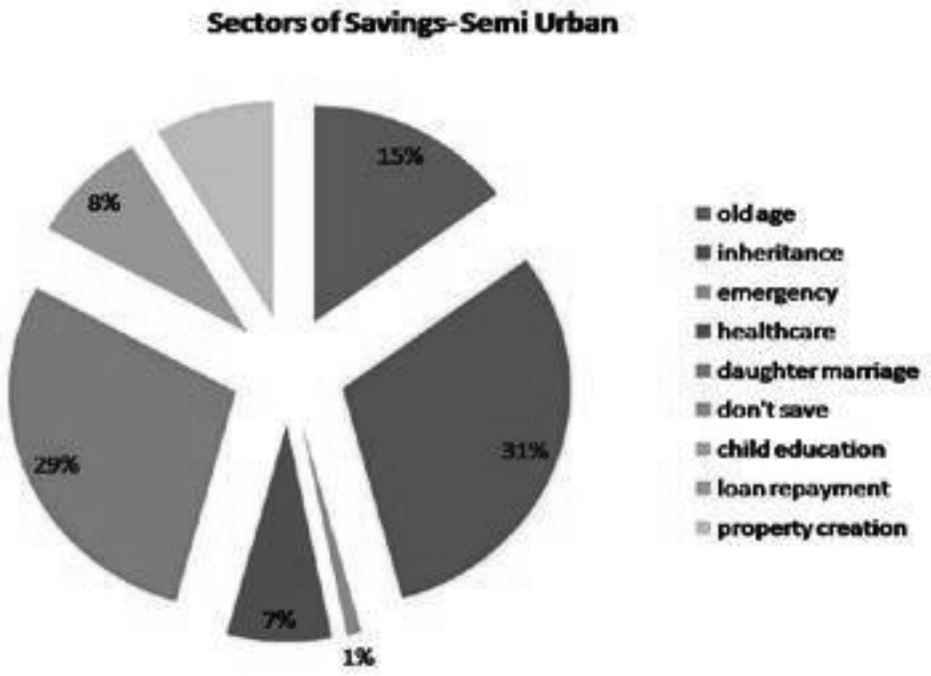


While savings for passing on as Inheritance and Old Age take top priority in the Urban Centre similar to the case of the metropolitan Centre, with 24% and 20% of households saving for this reason, Daughter's Marriage is the second biggest reason to save in the urban centre, with 22% of all households saving for this reason.

Next in priority, but far behind are the reasons of Emergency and Children's Education, which are given equal priority by the urban centre. 11% of households save for each sector.

Lowest in priority are reasons of healthcare, Property Creation and Loan Repayment with 7%, 4% and only 1% of all households saving for these.

Semi-Urban Centre



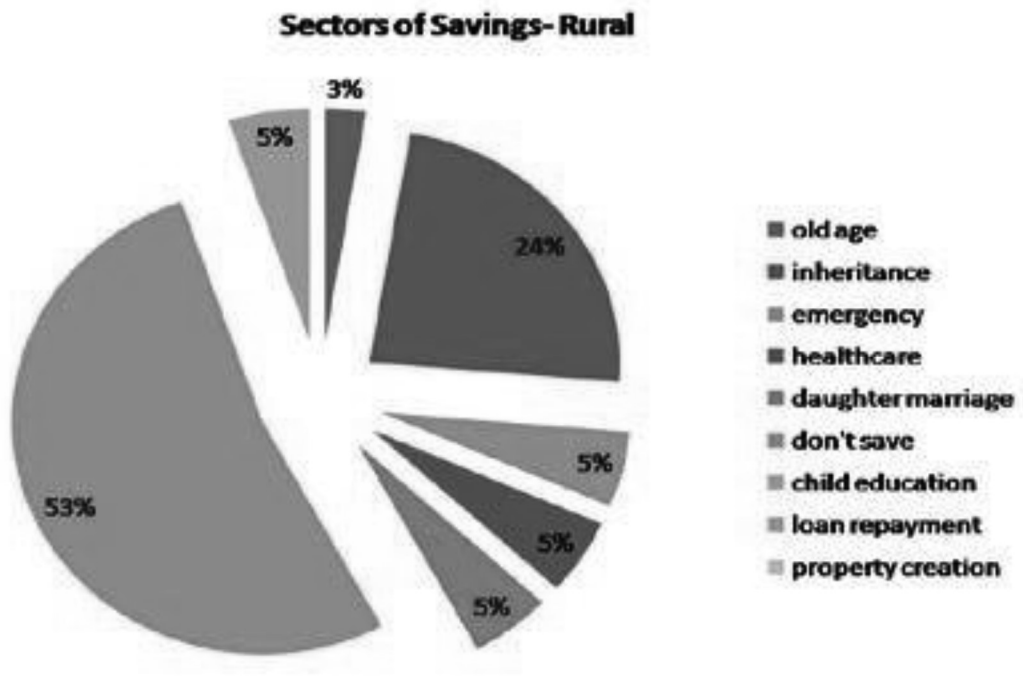
Inheritance and Children's Education are clearly the top reasons to save in semi-urban centre with 31% and 29% of all households saving for this reason.

Next in line, but far behind is saving for Old Age with 15% of all households saving for it.

Children's Education, Healthcare and Property Creation hold lower priority for savings in the Semi-Urban centre with only 8%, 7% and 9% of households saving for these reasons.

Savings for Emergency clearly takes the back seat in the semi-urban centre with only a meagre 1% of all households saving for this reason.

Rural Centre



Unlike the Metropolitan, Urban, Semi-Urban centre; where all households save for some reason or the other; a glaring 53% of all households in the Rural Centre donot save at all.

Of the other 47% who do save, Savings for passing on as Inheritance clearly takes the most and only prominent priority with 24% of all households saving for it.

Savings for Healthcare, Children's Education, Daughter's Marriage and Emergency appear to be on an equal level of priority in Rural Households with each reason having 5% of the households saving for it.

Savings for Old Age take the lowest priority with only 3% households saving for this reason.

Inferences and Conclusions

At the beginning of our research we had assumed we would find certain differences in the reasons of saving of households settled in different regions i.e. settled in the Metropolitan centre, Urban Centre, Semi-Urban Centre and Rural centre.

Though we did find differences, there were striking similarities, too.

Regardless of the region of settlement, 'saving for Building Inheritance money for the next generation' was the most popular reason to save. This shows the value households consider money to have in an agent able to better the lives of their next generation, instead of Child Education, or for that matter, healthcare.

The Metropolitan and Urban regions have 'savings for Old Age' as their common second most popular reason to save. Two inferences can be drawn from this finding. First, most households in the Urban and Metropolitan centres are *employed in the* Private Sector which doesn't provide pension after retirement to its employees, which causes them to save for after their retirement through their employed lifetime itself. This may actually be true, given the number of private sector units mushrooming around most urban and all metropolitan centres in India, higher relatively to other centres, causing a rise in non-pension paying jobs. Second, there is a high sense of insecurity and doubt of earners over the dependability of their offsprings to take care of them after they have retired. A rising culture of Individualism in Metros and Urban settlements which has also given rise to nuclear families and workaholism may be responsible for a certain reluctance of earners to rely on offsprings who later may be too busy in work to care for them, or in extreme cases, even want their parents around them. This may well cause the parents to save to be able to fend for themselves after they retire rather than having to rely on their children.

On the other hand, Savings for Old Age have lowest popularity in the surveyed Rural Centre. The still existing strongly traditional social fabric which glorifies and induces the value of living together in joint families and caring for parents can be a probable reason for this. Earners donot have to take for fending for their old age as they are assured their children would do that for them.

It is important to note, that in both Metropolitan, Urban centres and Rural centres, most employees donot receive a government pension (owing to the predominant private sector as an employer in Metropolitan areas and the farming as a non-pension providing occupation that most houses in rural areas engage in). Their attitudes towards savings however, differ. This shows how non-monetary aspects also hugely influence economic decision making.

Savings for emergency (whose detailed analysis has been presented in the larger research) is the third most popular reason to save in the surveyed Metropolitan Centre, while in the Semi-Urban Centre, it takes the lowest priority. Rural Centre doesn't save for this reason at all. Emergency savings are savings for contingency situations like sudden unemployment. Ideally the amount should equal about three to six months of the salary amount. Agriculture remains the most risk-prone profession with its high dependence on Monsoon, poor irrigation facilities, faulty legislation like the APMC Act and lack of refrigeration facilities which end up increasing the gap between the prices consumers pay and the money farmers get making farmers worse off. Most households in the rural centre are employed in this sector, and yet they donot save for emergency. This well explains farmer suicides wherein farmers donot have any money of their own to fall back on in times of need and are forced to borrow at high rates, non-payment of which leads them to take such harsh steps. A reason for this could be incomes which are so low that donot allow these farmers to save at all.

Moreover, among households in the Rural Centre saving for Daughter's Marriage, Child Education and Health have equal popularity. This shows these *households give equal priority to all the above causes.* However, Child Education is the second most popular reason to save in the Semi-Urban centre and the fourth most popular reason to save in the Metropolitan centre. This indicates the priorities of different households in different regions of settlement, wherein these two settlements clearly give a priority to Child Education above all else.

Daughter's Marriage is the second most popular reason to save in the semi-urban centre and has equal popularity to healthcare and Child Education in the Rural Centre. In a country like India where Dowry is still prevalent inspite of its illegalisation, savings for daughter's marriage can be linked to savings to build a good amount for her Dowry. This finding regarding the surveyed Rural and Semi-Urban centre being the lower developed centres relative to the Metropolitan and Urban centre can be linked to their adherence to traditional customs like Dowry for Daughter's Marriage.

On the other hand, among households in the Metropolitan centre, Daughter's marriage is the least popular reason to save. A modern bent-of-mind and better awareness regarding laws and equality between daughters and sons in most metropolitan centres relative to other centres may be a reason for saving attitude.

Healthcare, Loan Repayment and Property Creation figured to be the least popular reasons to save in nearly all areas of settlement. Saving for Property Creation is a long term saving which may is not bound to give immediate results, but results in the long term. *A general* aversion towards saving for this reason hints at an attitude of Impatience, wherein households prefer to save for getting fast returns rather than waiting for the long-term ones.

Low savings for Healthcare in general indicate a low priority given to this cause by households generally in all regions. Another reason could be high amounts of expenditure on maintaining good health like spending on gym memberships etc. in urban and Metropolitan centres which leads to low needs to save for healthcare in these regions, and a high presence of highly subsidised govt. clinics and dispensaries in semi-urban and rural areas which also lead to low need of saving for healthcare. These together may lead to an overall low saving on Healthcare.

Accounting for Bihar's Growth Experience 2006-2013

Megha Jha, III year

The aim of this paper is to answer the following questions which arise out of the tremendous growth success. First, the growth shown only in those sectors in which the government expenditure is highest suggests that this growth is mainly government led and hence the sustainability of such growth remains questionable. Second, this new found growth has done little for the agriculture sector and the economic growth in this sector has been dismal in recent years. Third, despite its economic success, Bihar has failed to show any remarkable improvement in social indicators - reduction in poverty and inequality, improvement in literacy rate and healthcare.

1. Introduction

The state of Bihar which was characterized by law and order problem, low human capital investments, agriculture and industrial stagnation, has come a long way from its haunted past. Since the year 2005 i.e., from the time the Nitish Kumar's government took the charge the state has been faring well in terms of growth and development indicators. Indeed, Patna was ranked above the neighboring city of Kolkata in a recent survey based on the business-friendly environment.

During the period 1999-2006, the economy of Bihar had grown at an annual rate of 5.7 percent. However, the economy witnessed a turnaround when it registered a growth rate of 12.0 percent during 2006-12 period. During this period, the investment level had also increased substantially. From an average annual plan size of Rs. 4200 crore during the Tenth Plan period (2002-07), the average plan size climbed to more than Rs. 16700 crore during the Eleventh Plan period (2007-12).

Although the performance of all the three sectors has been exemplary, this robust growth of the economy is services led. Within services too, the sectors experiencing a record growth are construction, communication, automobiles, banking and insurance, and trade, hotel and restaurant.

In order to understand the remarkable performance of the economy of Bihar in recent times, it is imperative to understand its past. Bihar's past can be segmented into two periods. The first period captures Bihar's pre-bifurcation period while the second captures its post-bifurcation period. Bihar's economy till the 1980s was primary agriculture based, both in terms of output and employment. The period after the mid-1980s saw a decline in relative per capita output between Bihar and India. In 1980-81, Bihar's per capita income was 60 percent of the national average which further dropped to 35 percent in the 1990s. The Central Statistical Organization (CSO) data on state-level per capita income shows Bihar as the poorest state in terms of per capita income in 1980-81. Although, Bihar's poor performance was well established by 1980, it was far from being an endemic failed state. In terms of per capita income over the period 1980-81 to 1984-85, Bihar grew at one of the then fastest rates of 5.3 percent. During the same period, Bihar witnessed a change in the structure of the economy. From being an agrarian economy, it came to emerge as one in which the services and the industries contributed remarkably. But the employment in Bihar remained overwhelmingly agrarian. This substantiates the arguments given by Ghosh and Gupta's (2010) and Sharma's (1995) that the failure of growth in Bihar was largely a failure of services and industries in drawing people out of agriculture.

Post-bifurcation, Bihar grew absolutely and relatively poorer due to the asymmetric distribution of the assets. The level of industrialization further slipped, since industry earlier was primarily concentrated in the Chota Nagpur belt, now part of Jharkhand (Das Gupta, 2011). Also most of the manufacturing units and power generation plants went to Jharkhand. Thus, the share of industries (excluding construction) dropped from 22.5 per cent to 4.6 per cent of NSDP. A natural consequence of the loss of the industrial sector was a substantial drop in the state's own share of non-tax revenue from this sector. Thus, over the years 1991-95, the industrial sector in Bihar contributed about 10 per cent to total revenue. This declined marginally to 7 per cent of total revenue for the 1995-2000 period. However, over the 2000-05 period it accounted for no more than 1 per cent of total revenue. A natural consequence of the bifurcation was that it shrank the fiscal space within which the state could finance development, relief and poverty alleviation activities. (Mukherjee and Mukherjee, 2012)

The period after 2005 marks a clear break from the past, in both a statistical and qualitative sense. While many of the structural changes seen in the past continue, and the relative position of Bihar amongst other states remains as is, there is distinct growth in economic growth. However, the key issue for the economy remains that in spite of this growth, much of the employment profile within Bihar remain largely rural, in the agriculture sector. Thus while Bihar's NSDP is driven by the services sector, it remained overwhelmingly rural, with 64 per cent of its workforce employed in agriculture (NSSO 2011).

The paper is an attempt to analyze the recent growth upsurge in the economy of Bihar. Section 2 analyzes the effect of this growth on all the three sectors.Section 3 looks at the role of government in driving the growth rates Section 4 analyzes the human development indicators in the state. Section 5 concludes the paper.

2. Sector Wise Performance

As Table1 shows, not only the economy as a whole experienced a high growth rate but each sector also witnessed a turnaround in the growth rates.

With economic development, it is historically observed that structure of any economy undergoes changes. This is true for Bihar also. This is because the pace of development of various sectors is different, leading to their relative size over the years. The growth rates of different sectors vary because of shifting demand patterns, a consequence of rising income. Labour force also tends to shift from primary to more prosperous industry and services. Figure1 shows the structure of Bihar's economy for the period 2003-04 to 2012-13. Instead of presenting year wise shares of sectoral outputs, the triennium averages of shares of sectoral outputhas been presented as they are more stable in nature, making the comparisons more meaningful.

Table 1: Sector-wise performance of the economy of Bihar

No.	Sector		1999-2000 to 2005-06		2006-07 to 2012-13	
			Current Prices	Constant 2004-05 Prices	Current Prices	Constant 2004-05 Prices
1	Agriculture/Animal Husbandry		6.1	3.0	19.8	5.9
2	Forestry / Logging		32.2	1.2	5.1	-1.9
3	Fishing		2.9	0.5	19.2	3.8
4	Mining/Quarrying		16.2	2.2	8.7	11.2
	Sub-Total (Primary)		**7.7**	**2.7**	**18.6**	**5.2**
5	Manufacturing		7.2	0.8	11.8	6.8
	5.1	Registered	-12.9	-18.4	20.9	18.2
	5.2	Un-registered	12.4	5.9	8.7	2.7
6	Construction		39.5	23.4	30.6	21.9
7	Electricity / Water Supply / Gas		11.7	3.7	13.3	7.7
	Sub-Total (Secondary)		**22.1**	**11.7**	**23.9**	**16.2**
8	Transport / Storage / Communication		10.0	6.6	16.5	19.2
	8.1	Railways	2.8	2.3	6.4	5.0
	8.2	Other Transport	13.7	4.3	20.6	11.0
	8.3	Storage			17.6	6.3
	8.4	Communication	16.2	18.1	21.1	38.4
9	Trade / Hotel / Restaurant		14.3	7.3	26.7	15.1
	Sub-Total (8 and 9)		**13.2**	**7.2**	**24.8**	**16.1**
10	Banking / Insurance		2.6	8.8	27.5	23.5
11	Real Estate/ Ownership of Dwelling/Business Services		18.7	7.0	17.5	10.1
	Sub-Total (10 and 11)		**11.7**	**7.7**	**21.1**	**16.3**
12	Public Administration		8.6	3.9	23.1	11.7
13	Other Services		10.1	3.7	16.4	6.1
	Sub-Total (Tertiary)		**11.7**	**6.0**	**22.2**	**13.7**
	Total GSDP		**11.6**	**5.7**	**21.5**	**12.0**
	Per Capita GSDP		**9.7**	**3.9**	**19.8**	**10.4**

Source : Directorate of Economics and Statistics, GOB

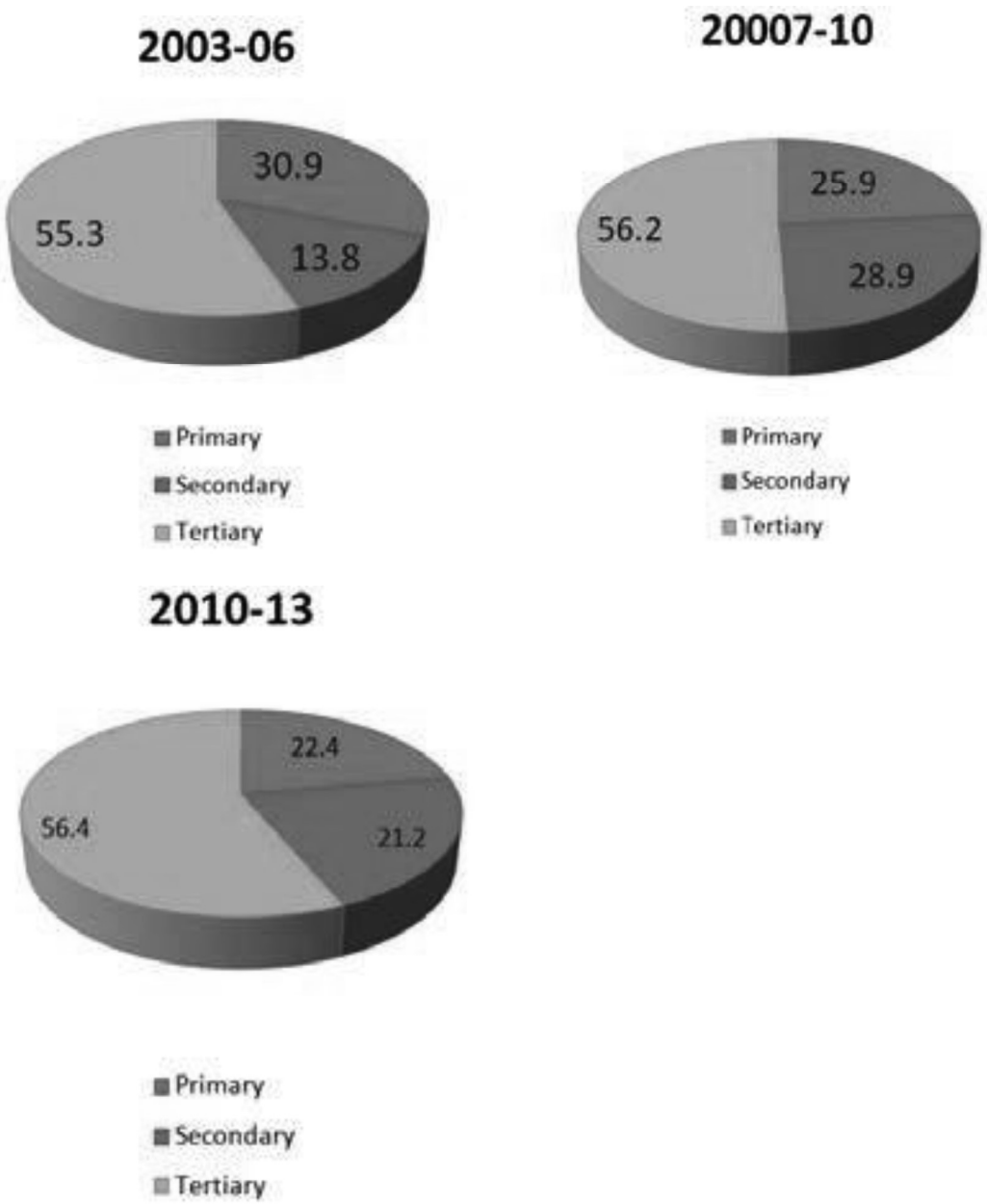


Figure 1:

In the beginning of the last decade, the average share of the 3 major sectors in total GSDP stood at 30.9 percent (primary), 13.8 percent (secondary) and 55.3 percent (tertiary). Thereafter, the share of the primary sector has been showing a decline over the years, and it came down to 25.9 percent for the triennium ending 2009-10 and then to 22.4 percent for the triennium ending 2012-13. This shows that the importance of the primary sector has declined steadily over the years. Since secondary and tertiary sectors recorded tremendous growth rate in the last decade, their shares of outputs are much higher than those in the triennium ending 2005-06.The relative share for the triennium ending 2012-13 now stands thus : primary (22.4 percent),secondary (21.2 percent) and tertiary (56.4 percent).

2.1 Agriculture amd allied activites

Although services sector has emerged as the clear winner as far as share of output is concerned, agriculture still remains very crucial for Bihar as it employs two-third of the total workers and three- fourth of the rural workers. The state of Bihar is blessed with rich fertile soil and benign water resources.

The growth rate of the state agriculture GDP in Bihar was negative in Ninth Five Year Plan (-1.4 per cent) which turned positive in the Tenth Five Year Plan (0.91 per cent). During the Eleventh Five Year Plan state agriculture GDP grew at the annual rate of 5.9 per cent. State agriculture sector also achieved a spectacular growth of 31% in the year 2006-07. But the state failed to maintain higher agricultural growth due to floods in 2007 and drought in 2009 and 2010.

Irrigation

Irrigation is one of the critical inputs for increasing agriculture production. But despite government's efforts irrigation facilities continue to be dismal in Bihar. Between 2001-02 and 2012-13, total irrigated area increased from 44.6 lakh hectares to 46.61 lakh hectares. State government expenditure on irrigation is spread over to many uncompleted projects. In addition, existing infrastructure has rapidly deteriorated as maintenance and operation is assigned lower priority.

Agricultural Inputs

Besides irrigation and fertile land, agriculture also requires adequate and quality inputs. These include seeds, fertilizers, farm equipments and highly professional extension services.

The Seed Replacement Rate (SRR) in Bihar has been low in Bihar in the past due to lack of firms for the supply of certified seeds. Under the major promotion programmes- Chief Minister's Crash Seed Programme, Seed Village Programme and Bihar Rajya Beej Nigam- three new seed processing plants were set up in various districts. As a result of these measures, an increase in crop productivity was recorded in the state. More significantly, the SRR has exceeded 33 percent for all major crops in 2011-12 and 2012-13. Also the high yielding varieties (HYV) covers 65 percent area under rice, 95 percent area under wheat and 88 percent area under maize.

The consumption of fertilizers has been constantly increasing in Bihar in recent years. The consumption of fertilizers registered an increase of 18.21 percent from 2009-10 to 2012-13.

Agricultural credits

The data related to agricultural credit indicates that the required supply of credit is far from adequate in Bihar. The flow of agriculture credit comprises three main sources: commercial banks, regional rural banks (RRB) and central cooperative bank (CCB). The relative share of these sources in 2012-13 stood at Commercial Banks (61.2 percent), RRBs (38.2 percent) and CCB (0.9 percent). In other words, commercial banks are the major suppliers of agricultural credit in Bihar. Since commercial banks and RRBs are not very keen to supply credit to agricultural sections (as they seek collaterals in time of disbursing credits), the cooperatives were supposed to play a big role in advancing agricultural credit in Bihar. But, unfortunately, their presence is very limited in Bihar.

Apart from the three major sources of credit, Kisan Credit Card (KCC) has been one of the important instruments through which credit is being channelized to farmers for agricultural operations. Under this scheme farmers are allowed a maximum credit limit of Rs. 50000 to procure necessary agricultural inputs.

2.2 Industrial Sector

Most of the governments that have been elected in Bihar in the post-independence era were myopic and cared mostly about their petty political gains and did not pay much heed to the development woes of the vast majority of people. Industrialization became from bad to worse with most of the units turning sick and

eventually getting closed (e.g., sugar mills, other agro-processing units, cement factories etc.). The poor law and order and security issues led to a massive capital flight in the 1990s. Among the things that were still left with Bihar, the bifurcation of the state in November 2000 took away most of the resource rich mineral areas and further aggravated its industrial woes.

During the tenth plan period, the industry sector in Bihar recorded a growth rate of 9.80 per cent. What this apparently healthy growth rate hides, however, is a range of structural weaknesses. For instance, the industrial sector in the state is overwhelmingly dominated by unregistered units that account for more than half of total income. Further, as revealed by the Annual Survey of Industries (ASI) data for 2002-03, more than 85 per cent of the net value added is accounted for by food and beverages, tobacco and petroleum products, clearly demonstrating the narrow base of industry. The Annual Survey of Industries for the year 2010-11 reported that out of a total of 2.12 lakh factories covered across the country, only 2807 units were in Bihar; this implied ashare of 1.33 percent for the state.

According to the ASI data for 2010-11, while other states use relatively more power as fuel fortheir factories, Bihar still continues to depend largely on petroleum products as fuel for theiroperation. In Bihar, the share of electricity in fuel cost is only 18 percent and that forpetroleum products is as high as 70 percent. The share of electricity in other states is Gujarat(35 percent), Karnataka (53 percent), and Maharashtra(51 percent).

During the Eleventh Five Year Plan Period registered manufacturing in Bihar saw massive expansion with a growth rate of 26.3 percent per annum. This is attributed to many project completions in the state. As many as 21 projects in the sector were completed worth Rs. 37.6 billion. On the contrary, the previous plan period saw completion of only 4 projects.

Fortunately, the government had realized the need for accelerated development in the industrial sector. A State Investment Promotion Board has been set up and a new Industrial Incentives Policy 2006 formulated after discussions with concerned parties representing both the government and the private sector. The main features of the new policy were VAT reimbursement, capital subsidy for captive power generation plants, abolition of annual maintenance guarantee and monthly minimum guarantee and exemption of electricity duties. The Cabinet has also approved a single window clearance system for all new industry (Das Gupta, 2011). The real strength of Bihar's manufacturing sector lies in its sugar industries. Among the industrial policies that the state government came up with, separate incentive policies were framed to boost up the sugar industry. However the real problem with the investments approved by the SIPB is the fact that a significant number of these investments have either failed or are yet to take off.

2.3 Services Sector

Services have been driving the growth of the economy of Bihar. Communication, transport, storage, banking and insurance, and trade and hotels have seen the fastest growth post 2005. Barring the year 2008-09, growth rate of banking and insurance has been above 10 percent per annum since 2005-06.

The number of registered vehicles is increasing every year and recorded a three fold increase from 1.62 lakh in 2007-08 to 4.40 lakh in 2011-12.

Since 2007, the footfall of foreign tourists has increased manifold. the number of tourists recorded more than six times increase in 2012 (11 lakh) over 2007 (1.77 lakh); simultaneously during the period, the number of domestic tourists was more than doubled. Of the total foreign tourists' arrival in top 10 states in India, 5 percent visited Bihar, putting the state at the sixth rank among the top ten in 2013.

3. Public Service Delivery

A World Bank report dated 2005 identified three important challenges for Bihar. These were poor growth, strengthening social services delivery, and strengthening public administration and governance. Social service delivery and public administration and governance jointly reflect the ability of the state government to provide high quality public services in the state. Not only was the ability to provide these services low due to understaffing in the preceding years, but together with non-performance and, in many instances crime, there was gross negligence as well (Mathew and Moore 2011; Mukherjee 2010).

While the Fiscal Responsibility and Budget Management Act (2006) left it upon the state governments to take advantage of the rising income opportunities, Bihar took the plunge and approved its own FRBM Act 2006 in response to the national FRBM Act and committed to containing the fiscal deficit to 3 percent of GSDP by 2008-09, a target that it achieved.

Figure2 plots the ratio of Bihar to all-India per capita development expenditure and there is a distinct rise from the 30-40 percent range in 2001-05 to the 40-50 percent range in the 2005-10 period.

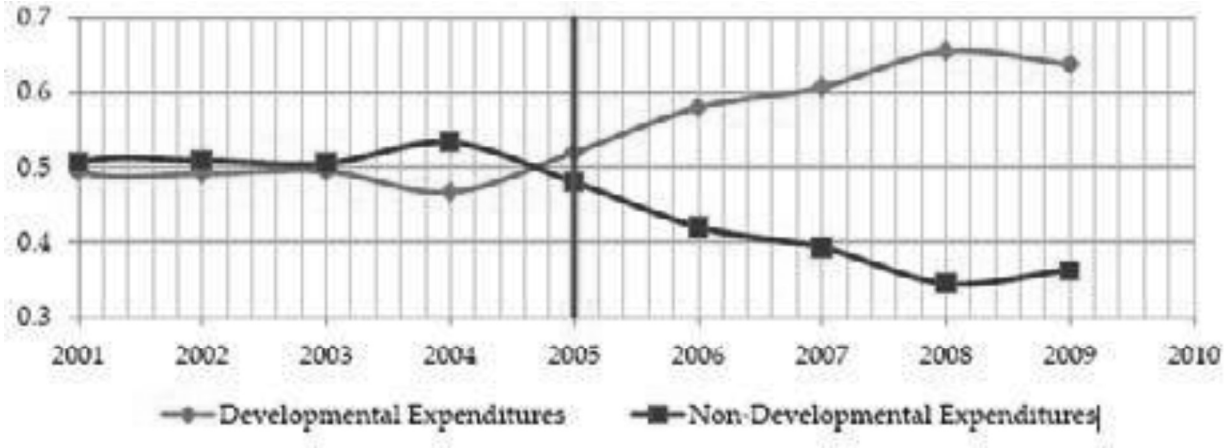


Figure 2:

Apart from being able to expand fiscal expenditure due to increasing central government assistance, the government of Bihar has worked hard at reallocating away from non-development heads to development heads to further raise the amount of expenditure in the state. Figure2 shows that until 2004-05, about half of all expenditure was on development activities and the other half was on non- development activities. From 2005 onwards, there has been a deliberate attempt to redirect expenditure toward development heads (Mukherjee and Mukherjee, 2012).

Infrastructure and power

One of Bihar government's agenda-setting attempts has been to ensure that the road networks are strong enough to enable people to reach Patna in a matter of six hours from anywhere else in Bihar. Thus, a dimension on which Bihar does well is the expansion of roads and bridges. Bihar presented a very dismal picture with only 119.72 km of roads for every 100 sq km of area as against all India number of 127.76 km of roads per 100 sq km of area. But in 2012-13, Bihar recorded a big jump by over 73 km, over the previous year, as against only 15 km at all-India level.

In terms of building bridges, Bihar's achievements have been very impressive. Over the 2006-09 period, the Bihar Rajya Pul Nirman Nigam constructed a large number of bridges than all those constructed in Bihar from 1975-2005. A total of 518 bridges have been constructed over the period starting from 2006-07 up until

the end of December 2010.

The phenomenal increase in the number of registered vehicles in Bihar is noteworthy. Over the period from 2005-06 to 2009-10, the total number of registered vehicles has increased from 80,000 to 3.19 lakh, i.e., a four-fold increase. This increase has often been attributed to the improved law and order situation but surely with better connectivity, vehicular traffic must have increased as well (Mukherjee and Mukherjee, 2012). The receipts from taxes on registration have gone up as well, from Rs. 133 crore in 2001-02 to 372 crore in 2009-10. Thus, expenditure on roads and bridges has improved the state government's ability to increase its own tax collection ina number of ways.

One of the consequences of the bifurcation of the erstwhile Bihar into today's Bihar and Jharkhand, is that while 70 percent of the power generation capacity went to Jharkhand, about 70 percent of the demand comes from Bihar. At 118 kWh, the per capita consumption of electricity in Bihar is lowest in the country, while the national average stands at 779 kWh. While the peak availability has been increasing, it has been just enough to catch up with the increasing peak demand, but not to bridge the deficit.

4. Social and human indicators

4.1 Education

Table 2 shows the share of expenditure on education in total budget and also with respect to total expenditure on social services. The share of expenditure on education in total expenditure on social services was 54.3 percent in 2007-08 and it has remained at the level subsequently. Though the share of education in total budget has declined from 18.3 percent in 2007-08 to 15.8 percent in 2010-11, it showed a remarkable increase in 2012-13 and stands at 37.0 percent.

Table 2: Expenditure on Education

Year	Expenditure on Education (Rs. Crore)			Expenditure on Education	
	Plan	Non-Plan	Total	as percentage of total budget	as percentage of expenditure on social services
2007-08	1046.26	4741.76	5788.02	18.3	54.3
2008-09	1565.52	5099.47	6664.99	17.9	51.7
2009-10	1585.02	5958.68	7543.70	17.6	52.7
2010-11	3356.97	4667.28	8024.25	15.8	49.7
2011-12	2901.18	6836.34	9737.52	29.8	49.8
2012-13	4949.63	8439.03	13388.66	37.0	54.8
CAGR	34.49	10.57	16.66	---	---

Source : State Government Finances, GOB

The state has improved significantly in increasing its literacy rate during the last decade, from 47.0 percent in 2001 to 61.8 percent in 2011. This implies an increase of 14.8 percentage points during the decade. it is worthwhile to note that this decadal increase is not only the highest among all the decadal growth rates in Bihar since 1961, it is also the highest among all the states for the decade 2001-11. In Bihar, the 2011 Census recorded male literacy at 71.2 percent and female literacy at 51.5 percent, recording a gender disparity of 20 percentage points. Bihar also made key gains with regard to enrolment ratios with the enrolment of girls increasing at a faster rate than that of the boys.

High dropout rate is another problem with the schooling system in Bihar. Interestingly, the government identified a number of policy responses to counter the dismal state of education in 2005. An important example could be an influential scheme granting Rs. 2500 to every girl studying in class IX and X to purchase a bicycle that could be ridden to school and providing uniforms to children. This scheme was announced in 2006 and achieves several things at once. To begin with, it targets the extremely poor state of education for the girl child in Bihar (Debroy 2010). Apart from these gender and education aspects, the scheme was also an extraordinary litmus test for law and order in the state and has proved to be one of the world's largest and most successful cash transfer program ever, with over 900000 cycles purchased over 2006-10 period.

4.2 Health

Most of the people in Bihar, as elsewhere in India, depend on public health facilities. Despite rapid development in recent years, the health sector confronts challenges in terms of wide social and regional disparities. In recent years, Bihar has made significant progress in meeting some of these challenges. This may be attributed to increased expenditure on health, expansion of health infrastructure, as well as constant monitoring of the health services.

Table3 shows life expectancy at birth, both for Bihar and India. While life expectancy at birth was lagging behind the national average for both male and female in Bihar in 2001-05 period, it surpassed the national average for male in 2006-10 period and bridged the gap with all India level substantially. Major gains have been achieved in crude death rate as well; while CDR for Bihar (7.5) was higher than national figure (7.4) in 2007-08, it became lower for Bihar (6.6) than the national average (7.0) in 2011-12.

Table 3: Life Expectancy at Birth in Bihar

State/India	2001-05			2006-10		
	Male	Female	Total	Male	Female	Total
Bihar	62.0	60.1	61.0	65.5	66.2	65.8
India	62.3	63.9	63.1	64.6	67.7	66.1

Source : Sample Registration System (SRS), Office of the Registrar General, India, Ministry of Home Affairs, GOI

As far as the health infrastructure is concerned, due to an increasing dependence of the population on public health facilities, there is a major burden on the public health institutions which calls for the need for major expansion of beds in different health institutions in Bihar.

4.3 Demography

The most obvious way in which demographic trends are known to affect the economy is through demographic transition-population birth rate and death rates adjust differentially to growing prosperity. The decadal growth rate of population for Bihar (25.1 percent) is much higher than that of India (17.6 percent), indicating the absence of demographic transition that many parts of India have already experienced.

The total fertility rate consistent with a population that is no longer expanding is 2.1 children per woman. Data from National Family Health Survey (NFHS) shows that while the total fertility rate for women in India went down from 2.68 children per woman in 1998-99 to 2.50 children per woman in 2005-06, for Bihar it went up from 3.7 to 4.0 children per woman. The fertility rate is still at 3.9 children per woman in Bihar and population projection suggests that Bihar will attain the replacement rate only by 2027 – one of the slowest states to achieve it. However, the silver lining to this expanding population growth is that Bihar's workforce is and will remain one of the younger workforces in the future.

5. Conclusion

By recording a growth rate of 12 percent per annum in period 2006-12, Bihar has secured its position among the fastest growing states in the country. However, what this growth rate hides is the fact that Bihar still stands the lowest among the states when it comes to social and human indicators. Even though it is catching up, Bihar's economy still remains overwhelmingly poor and there still remain fundamental challenges for the economy to resolve in the near future to sustain growth and include larger and poorer sections of the economy in the expansion process.

One of the key problems that the government needs to identify is the substantial amount of inequality existing within the state. While the districts like Patna, Munger, Begusarai, Bhagalpur, Muzzarfur and Rohtas are doing well, there exist districts like Madhubani, Sitamarhi, East Champaran and Sheohar that have not fared so well. Another key concern with the growth experience is the lack of inclusiveness. The poverty ratio in Bihar declined from 54 percent to 53.5 per cent, at a time when equivalent or poorer states like Odisha have managed to reduce their poverty ratios from 57 percent to 37 percent.

With income overwhelmingly generated in the services sector and employment in the agricultural sector, the growth has not made any dent in the inequality persisting in the state. The dominance of low agriculture sector, low per capita income and high poverty in rural areas of Bihar is attributed to lack of opportunities in industries, poor rural-urban growth linkages, underdeveloped infrastructure, population pressure on natural resources and high density of livestock (Kumar and Jha).

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Changing lives one drop at a time: Clean drinking water intervention in a village in Rajasthan: An Impact Assessment and Experiences from the field

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In this paper, we attempt to assess the impact of a clean drinking water intervention in Southern Rajasthan, backing it both by quantitative and qualitative data from the field collected by the authors in December 2014. The tank constructed is evaluated on three parameters which include drudgery reduction, health benefits and sustainability of the tank. While distance travelled is found to be statistically significant in one hamlet, the results from another hamlet are not significant. Though the health benefits of the tank can be measured only in the long term, we identify the measures by which the true health benefits of the tank can be realised. Recommendations are also made to improve other interventions using salient features of the tank, such as increased citizen partnership in implementation of a reform measure. Finally, practices such as supplementing the tank with other sanitation measures are recommended, in order to ensure sustainability of the health benefits of using the tank.

Introduction

Consumption of contaminated water and the subsequent water-borne diseases are one of the primary causes of stunted growth and child mortality; nearly 20% of deaths under the age of 5 are due to water-related diseases (World Health Organisation). A country can improve upon issues ranging from school retention and performance to labour productivity by providing access to clean drinking water to all its citizens. According to World Health Organization, for every $1 invested in water and sanitation, the economic return is between $3 and $34 (WHO/UNICEF). This translates into a return of at least 200-300%.

'Providing clean drinking water to all' has thus been made a permanent fixture on the checklist of the policy makers and non-governmental organisations. The United Nations had listed provision of 'clean drinking water to all by 2015' as a Millennium Development Goal. In a bid to achieve this goal, UNICEF and the WHO have initiated the WASH (Water, Sanitation and Health) programme. It also funds the Child Development Program along with the Sarva Shiksha Abhiyaan to increase the levels of sanitation in schools in India (UNICEF).

At the Central level, provision of access to clean drinking water and sanitation to the rural population is the mandate of the Ministry of Drinking Water and Sanitation. The Ministry has introduced two central programmes to carry out its mandate:

a. Swachh Bharat Mission (Grameen): The Government plans to spend 1.34 lakh crores on Water Sanitation and Health (WASH) in the next five years, under the revamped program.

b. National Rural Drinking Water Programme (NRDWP): The NRDWP has a target of providing 90% of the households in the country with piped water by 2022 (Ministry of Drinking Water and Sanitation). It aims to assist state governments and thereby gram panchayats in providing households with a sustainable source of water (Ministry of Drinking Water and Sanitation).

1 This paper won the first prize in the paper presentation competition at the Annual Winter Conference 2015, held at Ramjas College. Please address any comments to goyalananyaa@gmail.com or shrishti.singh1994@gmail.com

Rural drinking water supply (DWS) is a State subject, and may be entrusted to Panchayats. But 'to accelerate the pace of coverage of problem villages with respect to provision of drinking water', the Central Government introduced the Accelerated Rural Water Supply Programme (ARWSP) in 1972–73. The revised program, introduced in 2009, is called the National Rural Drinking Water Programme (NRDWP). It is noteworthy that the approach of the WASH policies in India has transitioned from a 'supply driven' and 'highly subsidy and infrastructure oriented' to a 'demand driven' and 'community-led' one (Department of Drinking Water and Sanitation)[2]. However, concrete steps towards this end are conspicuously absent from the framework of implementation of the policy. This paper attempts to bridge this gap by illustrating the key aspects of a successful WASH intervention and highlights the next step forward.

The various types of clean drinking water interventions include providing piped water to households; decreasing contamination of water at point of access and at the place of storage; building wells and tanks to provide and store water, etc. In this paper we attempt to assess the impact of a clean drinking water intervention by Sewa Mandir[3] in a tribal village in Southern Rajasthan. The intervention is a water tank constructed in each of the three hamlets of the village to provide clean drinking water to the inhabitants. The intervention consists of construction of a water tank in each hamlet; improving the drinking water quality at point of use; and influencing linkage between water supply, sanitation and hygiene. The intervention was introduced with the primary objectives of reduction in drudgery and water-borne disease incidence, and for providing a safe and sustainable water resource. The main objective of the impact assessment is to evaluate the impact of the intervention in light of the set objectives in the three hamlets. We then draw recommendations from the results of the impact assessment for future interventions.

Methodology

The authors have adopted a mix method approach to assess the impact of the intervention. In addition to using qualitative and quantitative data, we use both primary and secondary data to assess the impact. We relied on surveys and semi-structured interviews to collect data. A pre-post methodology was adopted to conduct the impact assessment. The base-line survey was made available to us by the NGO. The baseline data set consisted of information of 169 households in total.

The authors conducted the end-line survey in the 3 hamlets of the village in December, 2014. Data set consisted of a sample of 23 households out of 70 households in the three hamlets. We have dropped 1 hamlet from the analysis because of inconsistencies in data. Therefore, we use a sample of 10 out of 20 households in Mamadev and 8 out of 25 households in Dumper Valley. Though, we do not do a quantitative analysis in Thori Magri, the qualitative data collected there is used in the overall assessment.

We used the same survey questionnaire which was used in the baseline survey to assess the impact of the intervention on the same parameters. The survey questionnaire asked the respondents to report the time taken and

2 In Sanitation, this transition had been introduced under the move from the Central Rural Sanitation Program (1986) to Total Sanitation Campaign (1999). In DWS, it was introduced, to a limited extent, with NRDWP in 2009.

3 Sewa Mandir is an NGO based in Udaipur, Rajasthan which has been working over the past 45 years to change the lives of the poor for the better. Currently its operations have an impact on over 700 villages in Southern Rajasthan.

distance travelled to collect water. In addition, frequency of water collection; size of 'matkis' used; member of household who went for collection.

To assess the quality of water the villagers were asked to rate the quality of water on a number of parameters which included colour; odour; presence of insects; oil and rust; and algae formation.

They were also asked to mention whether they had been inflicted with a water-borne disease in the past one year. Other components of the survey included questions on presence of toilets, hand-washing habits, and suggestions for other interventions.

The three indicators of assessment used are drudgery reduction; decrease in water-borne diseases; and sustainability of the intervention. Wilcoxon Matched-Pairs T-test was used to analyse reduction in drudgery. We had to use secondary data to predict the potential impact of the intervention on health because this being a mid-term evaluation, the benefits on health are not entirely visible. We measure sustainability on three aspects- sustainability of source of water, infrastructure and longevity of the impact.

Intervention Overview

Rajasthan is one of the most arid regions of the country, with southern Rajasthan being one of the drier regions of the state. The village of Jogio ka guda, the location of the water intervention, is 35 km away from the City of Udaipur which is located in Southern Rajasthan. Sewa Mandir built a tank because settlements in this region are highly dispersed; hence a central pipe cannot be built. In addition wells and handpumps suffer from bacterial contamination and have maintenance issues, therefore building a tank was the only viable option.

The main village of Jogio ka Guda has a separate government tank constructed, whereas Sewa Mandir constructed 3 tanks in the three hamlets located a kilometre away from the main village. The three hamlets- Thori Magri, Mamadev and Dumper Valley are located 300-400 metres away from each other. The area has a population of 795, with 48% women and 52% men. The combined literacy level of the area is 52%, and 42% of the households are BPL card holders.

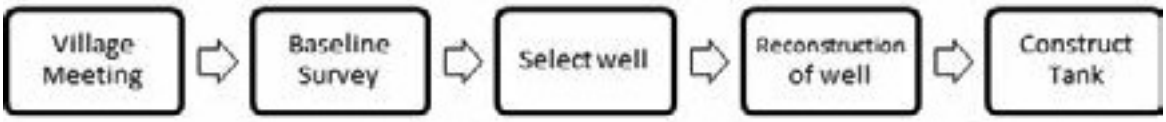

Figure 1 Process of building the tank

To construct the tank, the NGO first conducted a Participatory Rural-Appraisal (PRA) in the area to identify the key problems faced by the people in the village. They then administered a base-line survey on various parameters as described in the methodology. Once the need for the tank wass felt, the NGO asked the Panchayat and the villagers to identify wells for construction of the tank. The tank was constructed so as to provide water to 15-20 households for a period of 5 days. It had a capacity of 4000-5000 litres. To construct the tank, a citizen partnership model was adopted, wherein, the villagers contributed up to 20% of the cost of construc-

tion of the tank by providing labour and stones. Sewa Mandir contributed to 80% of the cost by providing technical expertise and other inputs. Due to unavailability of public wells in the hamlets, the NGO identified private wells suitable to be connected to the tank. The owners of the wells were convinced to let the tank be connected to the well by incentivising them with repairs of the wells sponsored by the NGO. The NGO also imparted technical knowledge, pertaining to upkeep of the tank, to 2 villagers from each hamlet. The women self-help groups in the hamlets had decided on a maintenance fee to be paid by every villager for the upkeep of the tank. The SHGs and trained villagers were responsible for cleanliness of the tank- by way of chlorination

Impact Assessment

A. Drudgery Reduction

In India 93 per 1000 households have to travel more than 200m to get water, whereas in Rajasthan the number rises to 190 (Ministry of Statistics & Programme Implementation). It takes a person 30 minutes to collect water in rural Rajasthan as compared to the national rural average of 20 minutes (MoSP). Women and young girls have to bear the lion's share of the duty of collecting water for the entire household. In our survey, only in 1 household did the men partake in this duty. Carrying heavy loads over long distances adversely affects the health of the women (Geere et al 52). In addition, they are unable to help in supplementing the family income and look after young kids, due to time lost in traversing long distances. With the mothers out all day, young girls are then entrusted with the responsibility of taking care of the youngest. This results in the young girls missing school (Shaheed et al 283-289). The economic cost of fetching water is extremely high. According to a study conducted by the World Bank in 2006, time spent in hauling water led to a loss of 673 million days for rural residents with an attached cost of Rs.36 billion (World Bank).

The primary objective of Sewa Mandir was to reduce drudgery by reducing the time taken and distance travelled in collecting water. We attempt to answer the following questions in this section:

1. *Has distance travelled to collect water reduced significantly?*
2. *What has been the effect on time spent on collection of water?*

A Wilcoxon Matched-Pairs T-test indicated significant difference between before-intervention and after-intervention distance travelled to collect water in Mamadev, $T (N = 7) = 0$, $p < .05$. However, surprisingly, in the adjacent hamlet (Dumper Valley) the test indicated no significant difference between before-intervention and after-intervention distance travelled to collect water, $T (N = 8) = 7$, $p < .05$.

The time taken to collect water in Mamadev reduced from 28.33 minutes to 15 minutes; a reduction by 47%. The intervention was thus successful in reducing the average time taken to collect water below the national average of 20 minutes (MoSP). In Dumper Valley, because the tank was not operational, data for time taken to collect water after construction of tank could not be collected.

Quantitative Measures of Drudgery Reduction		
Mean Distance travelled (meters)	*Before*	*After*
Mamadev	77.142	21.428
Dumper Valley	98.571	85.741
Time (min)	*Before*	*After*
Mamadev	28.33	15

Table 1: Quantitative Measures of Drudgery Reduction

However, there is a need to look beyond the quantitative measures of drudgery to gauge the actual impact of the assessment. Our semi-structured interviews with the women in the hamlet of Mamadev highlighted the following:

- It was easier for the women to collect water late at night, after returning from work.
- The efforts required in pulling out heavy buckets of water from well are immense. The construction of tank saved them from straining their arms and backs, multiple times a day, while collecting water.
- *"Main hun ghar ki mukhiya*": When asked who the head of the household was, this was the reply we got from the lady being interviewed. The reason she gave was that the power now lay with her. She felt 'responsible' for the successful implementation of the water tank project. It instilled a sense of empowerment in the women. The affairs of the tank were managed by a women self-help group in the village. Their responsibilities included collection of money for maintenance and chlorination of the tank. This made them feel both accountable and empowered.

B. Health

Water-borne diseases are one of the major fatal diseases in developing countries; in fact, a joint study by UNESCO and WHO says that they kill more young children than AIDS, malaria and measles combined (WHO/UNICEF). Diarrhoea is a particularly widespread disease in developing countries. Of all diseases, diarrhoea is the second leading killer of children (WHO/UNICEF).

An enquiry into the cause of the ubiquity of the disease reveals a common thread. An estimated 88% of diarrhoeal deaths can be attributed to consumption of contaminated water (WHO). Safe and clean drinking water and improved sanitation are thus, pivotal in improving on account of child mortality rates and general health in such regions.

The CDW intervention by Sewa Mandir includes reduction in diarrhoeal disease incidence as one of its major objective. The methodology used to assess the impact on this account is to ask the households to report the diseases in the family in the past year. However, this approach suffers from the following limitations:

- The diseases being reported are dependent on the recollection by the interviewee. Several gaps were

noticed in the data because of perceivably imperfect memory of the respondents. Often, the diseases reported in the baseline survey were not reported in the endline survey which was conducted in the same year.

- The impact of improved drinking water quality in terms of health is long-term. This being a mid-term assessment, the quantitative impact of the intervention in terms of reduction in the number of cases of diarrhoea and vomiting is not very conclusive.

Hence, we present our observations and data to gain some insights on the efficacy of the intervention but make no claims of certainty until further data is available.

Incidence of diarrhoea and vomiting was found to have gone down from 15% to 2% since the tank has been operational in Mamadev. Interviewees reported that "earlier, diseases were a common occurrence" but since then "there haven't been many so far". In addition, with reduction of drudgery being significant in Mamadev, it is expected that there would be concomitant benefits to the health of the carriers of the water load. Also, when asked to rate the quality of water on various parameters (Annexure 1), none of the respondents found any anomaly in the water supplied by the tank. On the other hand water from the handpump was deemed unfit for consumption; and while the water from the well was found to be largely clean, a few respondents reported finding insects in the water from the well.

Though provision of a tank to provide clean drinking water can reduce the intake of contaminated water; this may be offset by flow of particles from human excreta into the well, or by unhygienic practices. It is important to assess the impact of an infrastructure intervention on the health indicator by combining it with other sanitation interventions (UNICEF). A literature review of drinking water assessments points to the fact that improving supply or source of water alone cannot achieve the target of reduction of water-borne diseases (UNICEF). It needs to be supported with sanitation measure. In the three hamlets, all the villagers reported to defecate in the open. Open defecation can be a potential source of contamination of the well . Also, all the villagers used a hand mug to take water out from the container where water is stored. If the villagers do not wash their hands properly (50% of the households reported to wash their hands only with water after defecation, and before eating), the container might get contaminated which offsets the impact on health of the intervention.

Thus, it is necessary to supplement the construction of the tank with sanitation measures such as building of working toilets, and awareness campaigns regarding benefits of washing hands.

C. Sustainability

This being a mid-term evaluation we do not explicitly state whether the intervention performs on this indicator. Instead we report our findings in this section and list pointers so that the intervention can be improved at an early stage. *We assess the sustainability of the tank by exploring whether sustainable management of the facilities by beneficiary communities has been ensured?*

The sustainability of the intervention is measured on three parameters:

1. **Sustainability of source of water**: In the three hamlets of the village, the tanks were connected to wells from which water was supplied to fill the tank. The two tanks in Thori Magri and Dumper Valley were connected to perennial sources of water (wells), while the well in Mamadev was seasonal. The seasonality of the well in Mamadev would result in disruption in operation of the tank in summers, the season in which the need for the tank is felt most. In addition transfer of water from the well to tank depends on the functioning of the motor. In Thori Magri, the tank was rendered inoperative because of a fault in the motor. Thus, the source of water for the tank is not reliable.

2. **Sustainability of physical infrastructure of tank**: Sewa Mandir has ensured maintenance of the tank by allocating the responsibility of the upkeep of the tank on the villagers. They have imparted technical expertise to villagers and trained them in ensuring that the water in the tank is clean. The women SHGs in Mamadev ensured that the tank was chlorinated at the scheduled date. Thus, sustainability of the physical infrastructure has been ensured.

3. **Sustainability of impact**: For the impact of the tank to be sustained over a long period of time, it is necessary that there are no breaks in the supply of water (UNICEF). This however can only be ensured if the sustainability of the source of water is guaranteed.

Recommendations

For Other interventions based on the salient features of the tank built by Sewa Mandir

A. Interventions should involve Citizen Partnership by way of Community Management:

Citizen Partnership by way of community management and instilling a sense of ownership has played a pivotal role in the success of the intervention by Sewa Mandir. This is further highlighted by the limited success of a similar intervention by the government in a nearby village. A water tank was built on the same lines by the government in the village of Jogiyo ka Guda, with about 60 households. However, the tank failed to achieve its primary objective of making the tank the primary source of drinking water for the villagers. Interviews with the residents of this village revealed that the villagers were using the water from the tank for washing clothes or utensils. This was further corroborated from the survey done in village where only 36% of the households used the tank water for primary use i.e. for drinking and cooking, and 48% reported using it for secondary uses, such as washing of clothes and utensils. The primary reason cited for not using the tank water for drinking was that it was seen as 'unclean' and 'unfit', given that others were using the water for other purposes, near the tank itself.

On the other hand, the women SHG has been entrusted with the responsibility of ensuring that everybody used the water from the tank only for the purpose of drinking and cooking; our findings from the semi-structured interviews and corresponding questions in the survey corroborated this. The sense of responsibility towards the management of the resource is sharpened under such formal arrangements of community management

and the compliance of such rules by the rest of the villagers is ensured under pressure from their peers. This is a very significant factor in the success of an intervention in long run when the support of the organisation is no longer available, particularly where there is limited local social wealth (WHO). A top-down approach of grassroot interventions can threaten their very sustainability. Citizen Partnership and Community Management should thus be made an integral part of the DWS projects, right from the policy level.

Interventions should be demand-driven and cost of intervention should be shared :

The utter failures of the sanitation intervention in Dumper Valley hamlet shows how partnering with the locals can help sustain the intervention. Every BPL family in the hamlet of Dumper Valley had an attached dry latrine built by the government. However, the latrines were not used by the villagers, despite not having toilets of their own. The reasons cited for the same was that the villagers were hesitant in using dry toilets without water. In addition most toilets built were not constructed properly, without proper piping and pans. The villagers themselves were not willing to improve these toilets on their own because they felt that this was the government's job. On the other hand, the villagers were ready to pay for the upkeep of the tank built by Sewa Mandir because they had initially contributed 20% to the cost of the tank. They felt that they would incur a 'loss' if the tank did not function properly.

The situation described above highlights two recommendations:

1. **Interventions should be demand driven**: The village did not have a demand for dry toilets, or for toilets without running water. The villagers were not interested in using the toilets built for them. Thus, governments should follow the practice of NGOs of conducting a PRA before introducing an intervention. The PRA would help the government agency understand what the rural populace has a requirement for, and what they would use.

2. **Prospective beneficiaries should contribute to the cost of the project:** It is observed that the villagers are pro-active in maintaining the tank set-up by Sewa Mandir because they feel that they contributed to the cost of the tank. Also, the villagers are also responsible for the maintenance of the tank; hence they know that if they wish to reap the benefits, they need to pitch in.

For improvement of the tank built by Sewa Mandir

Case Study: Sawagi Bai- Why not her?

Sawagi Bai is a 60 year old lady living in the hamlet of Mamadev. She lives with her husband and has no kids. Sawagi Bai's husband has 3 other brothers who live nearby with their families. The four brothers share a private well. Their house is at a 200m distance from the cluster of houses which constitute Mamadev.

The villagers were supposed to incur 20% of the cost of the tank by contributing labour and stones. This was a necessary condition for setting up of tank. However, Sawagi Bai says that there is no one in the family who could contribute to the labour requirements of

the project. A young bride of the family used to go to work but couldn't continue as she had to take care of a young baby at home. The other villagers did not allow Sawagi Bai's family to partake in the project if they could not provide labour. Thus, the project lost a potential beneficiary (four households).

Interestingly, the family was willing to give extra money to make up for their inability to provide labour. The partnership set-up between the villagers and Sewa Mandir, however, did not have provision for this. This led to a feeling of exclusion in the minds of the family members.

It is important to note that Sawagi Bai was also the treasurer of the SHG responsible for the maintenance of the tank.

A. **Increase flexibility in the 'kind' of contribution by potential beneficiaries**

Situated in the above context, we recommend that Sewa Mandir increases flexibility in the 'kind' of contribution by the target population, and is inclusive of diverse needs for maximum impact.

B. **Supplement construction of tank with other sanitation interventions**

A literature review of clean drinking water intervention assessments points out that source water treatment and increased water supply decrease diarrhoeal morbidity by 11 and 23 percent respectively. Hand washing and increased sanitation reduce it by 44 and 36 percent respectively (UNICEF). Thus it is important to note that construction of tank cannot achieve the target of reduction in diarrhoea by itself. It needs to be supplemented with other sanitation and awareness interventions.

C. **Sustainable intervention for sustained impact**

It is imperative to note that for the benefits of the tank to sustain, it is necessary that there are no breaks in the water supplied by the tank (UNICEF). For example, if the objective of the tank is to reduce cases of water-borne diseases by providing clean water for drinking, the impact can be offset by a break in the supply of water. A break in the supply of water from the tank would force the users to switch back to unsafe sources of water which might undo the positive effects generated by the use of tank. In the specific example of the tank, the functioning of tank is contingent on the water supplied by private wells. The supply of water from these wells is conditional on the whims of the owner of the tanks. The owner of the well in Dumper Valley, for example, had stopped the supply of water from the well to tank because of requirement of water for irrigation of fields. Though the reason cited may be genuine, such discontinuities may lead to reduction in the impact of the tank.

Thus, Sewa Mandir should ensure that the inputs required for continuity in the benefits generated by the tank should not be contingent on any constraints. Thus, it is necessary for the intervention to be sustainable for a sustained impact

Conclusion

Consumption of contaminated water has been known to be the cause of a number of water borne diseases, which in turn are a primary cause of child mortality. Respiratory infections and diarrhoea account for 36 per cent of all deaths in children under five years of age (UNICEF). If a child is afflicted by a disease in his or her formative years, its growth is stunted and may lead to future abnormalities. This may cause financial hardship on the parents, escalating into the family being caught in severe debt. Consumption of water of inferior quality can thus cause child mortality, poverty among other problems. A country can get rid of a number of problems plaguing it by providing access to clean drinking water to all its citizens.

This paper assesses the impact of a tank built by Sewa Mandir in a tribal village in Southern Rajasthan. While, reduction in drudgery is statistically significant in one hamlet, it is not significant in the adjacent hamlet. The potential impact on health can be realised only when the water supply intervention is supplemented with sanitation interventions. In addition, for the tank to be sustainable it is necessary to ensure that its source of water is perennial. In addition, community management is instrumental in maintenance of the tank.

The salient features of the tank constructed by Sewa Mandir that can be applied to other interventions include increased citizen partnership in the implementation of interventions. Second, the reforms introduced should be demand driven. Third, the recommendations for improvement of the tank include increasing flexibility in the 'kind' of contribution by potential beneficiaries; supplementing construction of tank with other sanitation interventions; and finally making sure that the tank is a sustainable intervention for a sustained impact on the lives of the beneficiaries. These considerations towards the planning and implementation of a WASH intervention form the next steps forward in the transition to a practical and reasonable approach.

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The Para-teacher Scheme in India

An analysis of the impact of the para-teacher scheme on the learning outcomes in India with particular reference to the states of Bihar and Uttar Pradesh[1]

Mridul Joshi, III year

This paper provides an overview of the para-teacher scheme, in the wider context of the education sector, in India. Para-teachers or contract teachers, unlike regular teachers, are those who are generally employed on annual contracts and are paid one-fifth to one-half of the payments that regular teachers receive. The paper aims to study the relation between the para-teachers and the learning outcomes in the country. For this, the author undertakes a regression analysis of the learning outcomes across the different states of India. The results are studied in the light of various other studies that were undertaken on a larger scale. It confirms that there is no difference in learning outcomes from para- and regular teachers. The paper also studies the specific case of Bihar and Uttar Pradesh in the context of the para-teacher scheme as they provide polar opposite pictures of the para-teacher scheme.

1. Introduction

In the last few decades primary school education in India has received unprecedented attention from policy makers and educational planners alike. The learning outcomes in government schools are consistently getting better (ASER 2013). The cause of primary education, which was apparently neglected during the first and second five year plans, has now become one of the central focuses of the government.

The Sarva Shiksha Abhiyan (SSA) is the flagship programme of the Indian government to achieve universal elementary education in the country. It was mandated by the eighty-sixth amendment to the constitution of India, making free and compulsory education to the children of 6-14 years age group, a Fundamental Right[2]. The Right to Education Act, 2009, contains all the details of the programme.

The number of primary school grew spectacularly in the 1990s and onwards. This was accompanied by a steep rise in the number of school enrolments (See Table 1). Although large number of enrolments is definitely a good sign of progress in school education, it may not be the best variable to proxy for better learning outcomes. This is the situation when a large mass of students is enrolled in the beginning of the year but gradually drop-out through the course of the year.

1 Please address any comments to joshi.mridul9@gmail.com.
I am immensely grateful to Dr Deb Kusum Das, generally, for his encouragement to undertake research paper writing and, particularly, for his suggestions for this study.

2 Fundamental Rights is a charter of rights contained in the Constitution of India. The seven fundamental rights recognised by the Constitution of India are Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Right to Elementary Education.

Table 1: School Enrolment and Out Of School Children

	Govt.		Pvt.		Other		Not in school		Total
Age group	2006	2013	2006	2013	2006	2013	2006	2013	
6-14 ALL	NA	66.8	NA	29	NA	1	NA	3.3	100
7-16 ALL	71.3	64.5	18.5	28.9	1.2	0.9	9.1	5.7	100
7-10 ALL	75.2	67.9	18.6	29	1.5	1.1	4.7	2	100
7-10 BOYS	74.2	64.8	20.2	32.3	1.4	1	4.1	1.9	100
7-10 GIRLS	76.3	71.3	16.7	25.4	1.6	1.2	5.4	2.1	100
11-14 ALL	71.6	65.3	18.6	28.8	1	0.8	8.9	5.1	100
11-14 BOYS	71.6	62.5	19.8	32.1	0.9	0.8	7.7	4.7	100
11-14 GIRLS	71.7	68.4	17	25.3	1	0.8	10.3	5.5	100
15-16 ALL	60.1	53.6	18	29	0.7	0.6	21.2	16.8	100
15-16 BOYS	61.1	52.4	18.2	30.8	0.6	0.5	20.2	16.4	100
15-16 GIRLS	58.8	54.8	17.8	27.3	0.7	0.8	22.7	17.2	100

Source: ASER Report (2006) and ASER Report (2013)

The quality of education imparted in the schools also needs to be targeted. Teacher education programmes today train teachers to adjust to a system in which education is seen as the transmission of information. Attempts at curricular reform have not been adequately supported by the teacher education. Existing teacher education programmes neither accommodate the emerging ideas in context and pedagogy nor address the issue of linkages between school and society. There is little space for engagement with innovative educational experiments. Knowledge is treated as 'given' and that it is merely required to be transmitted to the pupils (NCF 2005).

Govinda and Josephine (2004) found out that the demand for schooling infrastructure and consequently the demand for teachers varied by a huge difference across states. Kerala, which is in the population stabilisation phase, is a distant outlier amongst the states as it shows an oversupply of physical and human resources for its primary education. In other states like Tamil Nadu, Karnataka and Andhra Pradesh, the number of kids entering primary schools has started falling gradually. This implies that the demand for physical infrastructure and teachers will become constant in a few years, assuming that these states have already created adequate capacity to accommodate all children of the school going age as indicated by gross enrolment ratios. However, this may be a distant thought as the completion rate for the primary school is still very low and participation in the grade 6 to 8 level is also very low.

The third set of states includes mainly the BIMARU[3] states that house about seventy-five percent of the total school-going population of India. These have a constantly growing demand for schooling infrastructure and teachers to take care of the ever increasing population in these states. In addition to the population problem, these states have remained stagnant economically and are therefore unable to raise resources within the state. Thus, most of the states are almost fully dependent on the Centre for resources to direct towards the education sector. To lessen the financial burden on the state exchequer, the government may wish to substi-

3 BIMARU (meaning sick) refers to the relatively less developed states of India viz. Bihar-Jharkhand, Madhya Pradesh, Rajasthan and Uttar Pradesh.

tute regular teachers with para-teachers mainly for two reasons. First, it will prevent a recurring burden on the state and second, the para-teachers are paid a fraction of what regular teachers are paid.

It is mainly for the afore-mentioned reasons that the author shows special interest in the case of Bihar and Uttar Pradesh. The need for para-teachers is felt most gravely in these two states due to their backwardness conjugated with their size. According to Kingdon and Muzzamil (2001), the most striking weakness of the schooling system in rural Uttar Pradesh is not so much the deficiency of physical infrastructure as the poor functioning of the existing facilities. Even the existing schools do not have enough teachers and those that have face the problem of high absence rates. The case of Bihar is no different although in the recent years it has shown a marked improvement in its educational indicators (ASER 2013).

In Section 2, the author tries to examine the current situation of para-teachers in India and how they compare to the regular teachers in the government schools. Section 3 tries to seek a quantitative relation between the inclusion of para-teachers in schools and the respective learning outcomes. Section 4 takes up the specific case of Bihar and Uttar Pradesh with reference to the para-teacher scheme. Section 5 conclusively summarises the issue at hand.

2. Para Teachers in India

Para-teacher is a generic term applied to characterise all teachers appointed on contract basis often under varying service conditions in terms of emoluments and qualification requirements (Govinda and Josephine 2004). The definition of para-teachers or contract teachers[4] varies across different states. In fact, official state documents refer to them in vernacular terms[5] such as *Shiksha Karmi*, *Shiksha Mitra, Guruji* and so on depending on the scheme under which they are employed.

Generally, the para-teachers are less qualified than their regular counterparts and receive one-fifth to one-half of the salaries received by the regular teachers. They serve three major purposes. First, they help to expand schooling in a low cost way to remote hamlets that are not served by regular government schools. Second, they help increase the number of instructors in single-teacher schools. Third, they help reduce high pupil-teacher ratios (PTRs). Although, the model varies from state to state, the contract is usually tenable for ten months per year, but is annually renewable (Kingdon 2007).

Comprehensive data on contract teachers is collected every year by the District Information System for Education (DISE). According to it, all states have reported the employment of contract teachers though in a few states (Andaman and Nicobar Islands, Sikkim, Dadar and Nagar Haveli, Lakshwadeep etc.) their presence is negligible.

4 In this paper these two terms, 'contract teachers' and 'para teachers' have been used interchangeably though not all contract teachers are necessarily para teachers in the sense of para professionals. In some states, para-teachers are recruited as assistants to the regular teacher and may or may not end up giving lessons in the capacity of a regular teacher but with service conditions of a para-teacher. In other cases, they may simply be recruited in the capacity of regular teachers on a contract basis but with lower pay and educational qualifications.

5 Rajasthan had already initiated the *Shiksha Karmi* (education worker) project in 1987. Several states devised their own versions of *Shiksha Karmis* in the 1990s. For example, under its Education Guarantee Scheme, Madhya Pradesh utilised such para-teachers called *guruji*, building on the Alternative School Programme initiated in 1994-95 by an NGO, the Rajiv Gandhi Prathmic Shiksha Mission. Uttar Pradesh had a *shiksha mitra* project. Other states that utilized para-teachers on a large scale in the 1990s were Andhra Pradesh, Gujarat, Himachal Pradesh, and West Bengal.

In 70986 schools (5.44 percent of total schools) only contract teachers were working in 2009-10 as compared to 71494 (5.56 percent of the total schools) in 2008-09 (See Table 2). This observation is perhaps due to the fact that some schools absorbed the para-teachers into the regular teacher pool. It is, however, possible, that they received salaries less than the regular teachers. Across the country, as many as 637000 contract teachers were working in 2009-10 which is 10.97 percent of total teachers, compared to 538000 (9.39 percent) in 2008-09. The DISE data shows a decline of 45798 which is 7.84 percent of the total contract teachers in the previous year (Mehta 2010).

Table 2: Distribution of Contract Teachers by School Category

	Number of Contract Teachers						
			Total			Rural Areas	
School Type	**Male**	**Female**	**2009-10**	**2008-09**	**2007-08**	**Number**	**% to total**
Primary only	224738	195496	420234	369003	383765	398737	94.88
Primary with upper primary	79366	50436	129802	91653	113893	118034	90.93
Primary with upper primary and secondary/sr. secondary	6140	7228	13368	11093	11024	8207	61.39
Upper primary only	17468	11330	28798	15571	15337	27162	94.32
Upper primary and secondary/sr. secondary	22274	22848	45122	50695	56350	36365	80.59
No response	0	0	0	11	3455	0	0
All schools (2009-10)	349986	287338	637324	–	–	588505	92.34
All schools (2008-09)	293220	244806	538026	–	–	494922	91.99
All schools (2007-08)	325927	257897	583824	–	–	540744	92.62
All schools (2006-07)	292831	220807	513638	–	–	475859	92.64
All schools (2005-06)	305973	192971	498944	–	–	464535	93.1
All schools (2004-05)	241926	135740	379385	–	–	346824	91.42
All schools (2003-04)	167730	91369	259099	–	–	240734	92.91

Source: Mehta (2010)

It is interesting to observe the actual educational qualifications of para- and regular teachers. Contrary to the commonly held view that para-teachers are less qualified, their overall qualification maybe somewhat higher than their counterparts (See Table 3). To cite Kingdon and Sipahimalani-Rao (2010), only 14.5 percent of para-teachers have 'secondary or less' qualifications but among the regular teacher group, the same proportion is 26.4 percent. There are reasons as to why the academic qualifications of para-teachers are higher than that of regular teachers. Para-teachers are substantially younger in age than regular teachers and younger cohorts tend to have higher education than older cohorts. Table 4 illustrates this using DISE statistics. Although, the para-teachers have higher qualifications compared to the regular teachers, they generally do not possess professional teacher qualifications (see Table 5). Nevertheless most states have some kind of induction training for para-teachers, varying from seven days to two months (Kingdon and Sipahimalani-Rao 2010).

Table 3: Academic Qualifications of Para-teachers and Regular Teachers

	All areas		Rural		Urban	
Education	**Regular**	**Para**	**Regular**	**Para**	**Regular**	**Para**
Below secondary	4.1	3.7	4.2	3.7	3.7	3.5
Secondary	22.3	10.8	23	10.7	18.9	13.2
Up to lower secondary	26.4	14.5	27.2	14.4	22.6	16.7
Higher secondary	29.3	39.4	30.5	39.8	23.6	31
Graduate	29.8	32.9	28.4	32.7	36.7	37.2
Postgraduate	14.5	13.2	13.9	13.1	17.1	15.1
Graduates and postgraduates	44.3	46.1	42.3	45.8	53.8	52.3

Source: Mehta (2008)

Table 4: Age Profile of Para-teachers and Regular Teachers

	18-25 years	26-35 years	36-45 Years	46-55 years	Above 55 years	No response
Male						
Regular teacher	9.5	30.7	26.3	20	8	5.4
Para-teacher	25.3	51.2	12.7	2	1.4	7.3
Female						
Regular teacher	7.6	32.5	26.4	17	4.3	4.2
Para-teacher	39	39.5	9.9	1.7	1.1	8.8

Source: Mehta (2007)

Table 5: Professional Qualifications of Para-teachers and Regular Teachers

	All areas		Rural		Urban	
Qualification	**Regular**	**Para**	**Regular**	**Para**	**Regular**	**Para**
BT or equivalent	32	14.2	33.4	14.6	25.1	9.3
SBT or equivalent	24.2	7.6	23.7	7.4	26.5	9.8
B.Ed. or equivalent	21.7	14.2	20.5	13.2	27.7	26.6
M.Ed. or equivalent	1.2	1.5	1.1	1.4	1.7	3.2
Others	2.7	7.5	2.7	7.5	3.2	6.6
No response*	18.1	55.1	18.6	56	15.8	44.5

*Includes teachers without any professional qualification.

Source: Mehta (2008)

Political leaders think that the para-teacher scheme is the most effective way to lead to the goals of the SSA. However, not everyone is happy with the scheme. Professional teachers association have been vocal about their opposition to the para-teacher scheme as they believe that the para-teacher scheme lays a de-emphasis on the professional nature of teacher's work by employing people who do not possess adequate professional orientation (Govinda and Josephine 2004). However, this opposition has not been vehement or consistent.

3. IMPACT OF PARA-TEACHERS ON QUALITY OF EDUCATION

Although initially para-teachers did not get a lot of attention from the academia as well as policy makers as they perhaps thought it to be a short term passing phase, it has now become a contentious issue for scholars of primary education due to the large scale induction of para- teachers in the education sector. The supporters of the para-teacher scheme have listed out many benefits such as lower PTRs, greater accountability and less absenteeism. However, these supposed benefits have not been tested. It is also unfortunate that there is randomised evaluation study of the quality of teaching and learning in the classroom. Nevertheless, in this section, we perform an OLS regression based on the available evidence, to determine the impact of para-teachers on learning outcomes.

Due to certain constraints, the author shall restrict the regression to four independent variables across the different states in India viz. a percentage measure of attendance rate of the students ($ATTENDANCERATES_{2007}$), an index of teaching-learning material available in the school ($INDEX_{TEACHING}$), the average pupil-teacher ratio in the state (PTR_{2010}) and the number of contract teachers employed as a percentage of the total teachers in the state (PCT). The dependent variable is an index of learning outcomes across different states ($INDEX_{OUTCOME}$). The Appendix to this paper describes how the above indices were created. The problem of heteroscedasticity was dectected and data has been corrected for it.

$$\boldsymbol{INDEX_{OUTCOME} = \beta_0 + \beta_1 ATTENDANCERATES_{2007} + \beta_2 INDEX_{TEACHING} + \beta_3 PTR_{2010} + \beta_4 PCT}$$

The above regression is described below, where pct_het stands for PCT, ptr_het stands for PTR_{2010}, attend-_ het stands for $ATTENDANCERATES_{2007}$, indteach-het stands for $INDEX_{TEACHING}$, lo-out-het stands for $INDEX_{OUTCOME}$ and _cons is the constant.

Source	SS	df	MS
Model	.644344064	4	.161086016
Residual	.245478711	21	.011689462
Total	.889822775	25	.035592911

Number of obs = 26
F(4, 21) = 13.78
Prob > F = 0.0000
R-squared = 0.7241
Adj R-squared = 0.6716
Root MSE = .10812

lo_out_het	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pct_het	1.959238	8.111698	0.24	0.811	-14.90996	18.82844
ptr_het	-5.262128	12.2354	-0.43	0.672	-30.70703	20.18278
attend_het	99.10096	25.2757	3.92	0.001	46.53726	151.6647
indteach_het	1155.828	462.8764	2.50	0.021	193.2238	2118.432
_cons	-10.41751	.303296	-34.35	0.000	-11.04825	-9.786773

Due to lack of availability of data for the year 2009-10, the attendance rates of 2007 were used. The result s consistent with the observation. The attendance rates are positively related with the learning outcomes.

The parameter is statistically significant at 5 percent level. Attendance rates is a more reliable indicator of school participation and learning than enrolment rates as large enrolments at the beginning of the year mask low attendance in the course of the year and drop-outs later in the year. Children who attend more lessons generally perform better than those who do not. As Kingdon et. al. (2004) notes, while attendance rates are not a guarantee of grade completion or of achieving minimum levels of learning, these are nevertheless highly encouraging trends.

The pupil-teacher ratio shows a negative relation with the learning outcome index, although it is not statistically significant. This negative relation is sensible as the teaching process becomes more productive if a teacher has to cater to a lesser number of students. Children learn better if class size is small (Pupil-teacher ratio is a proxy for class size) as they would receive more attention from the teacher and would be better placed when it comes to learning outcomes. However, this cannot be confirmed with the data used here.

The teaching index relates positively with the outcome index and is statistically significant at the 5 percent level. The index determines the availability of teaching-learning material (TLM) in the school. This consists of the following heads: library books available, library books in use by children, teaching-learning material (black board, toys, colours, art sets, rulers etc.) observed in standard 2 and teaching-learning material observed in standard 4 (ASER 2010). Thus, the states that have the majority of schools possessing TLM show better learning outcomes. The more the learning resources the child has access to in school, the better he performs.

It is interesting to note that the number of para-teachers as a percentage of total teachers in the state, although positively related to the learning outcomes, is not statistically significant. Although the number of observations employed in this study prevents the author from making a conclusive statement, yet it points in the direction of other studies that were undertaken previously with larger samples.

The EdCIL (2008) study also found that being a regular or para-teacher did not matter for learning achievement of students in class five.

In a more detailed World Bank study by Sankar (2008), an attempt is made to control for the students' background and for school factors. The study uses a large data set of 360 schools, 920 teachers and 4200 students of grade 4 in the states of Andhra Pradesh, Madhya Pradesh and Uttar Pradesh. According to it, raw data points to the fact that children taught by para-teachers have slightly lower learning levels but once background factors are controlled for, the difference in learning outcomes disappears.

As can be seen, most studies suggest hardly any difference between the learning outcomes in students taught by para-teachers and regular teachers (Kingdon and Sipahimalani-Rao 2010).

This may be a little puzzling because the para-teachers are generally under-qualified professionally and lack experience, unlike the regular teachers. So why is little or no difference observed in the learning outcomes of their respective students? This anomaly can be explained in the following manner.

The positive impact of the para-teachers may make-up for the high rate of absenteeism prevalent amongst the regular teachers in government schools. This positive impact emanates from the fact that the para-

teachers are locally hired and thus may be absent less often. This may be result due to absence of job security for para-teachers and their terminable contracts. Also, by virtue of being locally hired, they may be more accountable to the Village Education Committees (VECs), School Management Committees (SMCs) and parents. Again, these benefits remain to be tested by a randomised evaluation study before any definite argu- ment can be made.

1. The Case of Bihar and Uttar Pradesh

Due to their large sizes and poor development indicators, Bihar and U.P. have always remained central to any discussion on the educational status of India. According to the ASER Report 2013, only 47.9 percent of standard 3 to 5 children can read text of standard 1 level or more, only 41.1 percent of standard 3 to 5 children can do subtraction or more, only 66.1 percent of standard 6 to 8 can read text of standard 2 level and 54.5 percent of standard 6 to 8 can perform division. The learning levels in U.P. are much worse than those of Bihar (see Table 7). As such, para-teachers become instrumental in reducing the pupil-teacher ratios in these two states where fast capacity-building may not be possible. Thus, para-teachers help bring education to remote areas that are not served by regular primary schools.

Table 7: Learning levels in U.P. in 2013

Grade 3-5: learning levels(%)		Grade 6-8: learning levels (%)	
can read grade 1 text	can do subtraction	can read grade 2 text	can do divison
47.8	36	62.8	37.6

Source: ASER Report (2013)

Bihar

Figures 1, 2, 3 and 4 describe the trend in reading levels and arithmetic abilities in Bihar and U.P. over the period 2009-2013. It can be seen that there has been a marked improvement; however, a lot remains to be desired. A part of this growth may be attributed to the growth of para-teachers in the state. Bihar had 22896 contract teachers in 2010 which is roughly 6.9 percent of the total teachers in the state (Mehta 2010).

Figure 1: Trends over time: Percentage children who can read Standard 2 level text by class in Bihar (All schools)

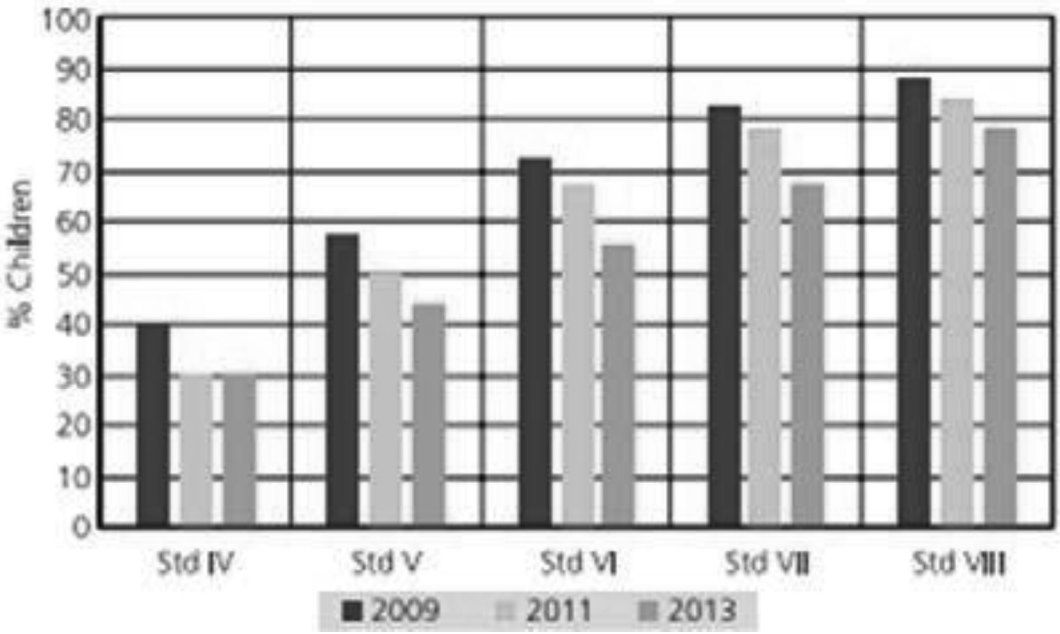
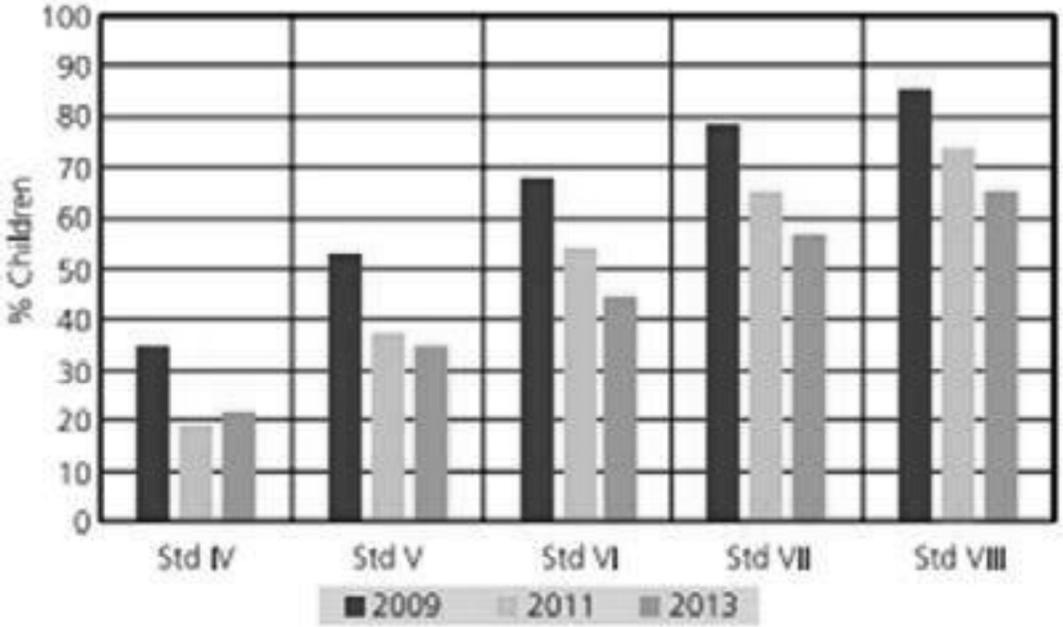


Figure 2: Trends over time: % Children who can do division by class in Bihar (All schools)



Source: ASER Report (2013)

Figure 3: Trends over time: Percentage children who can read Standard 2 level text by class in U.P. (All schools)

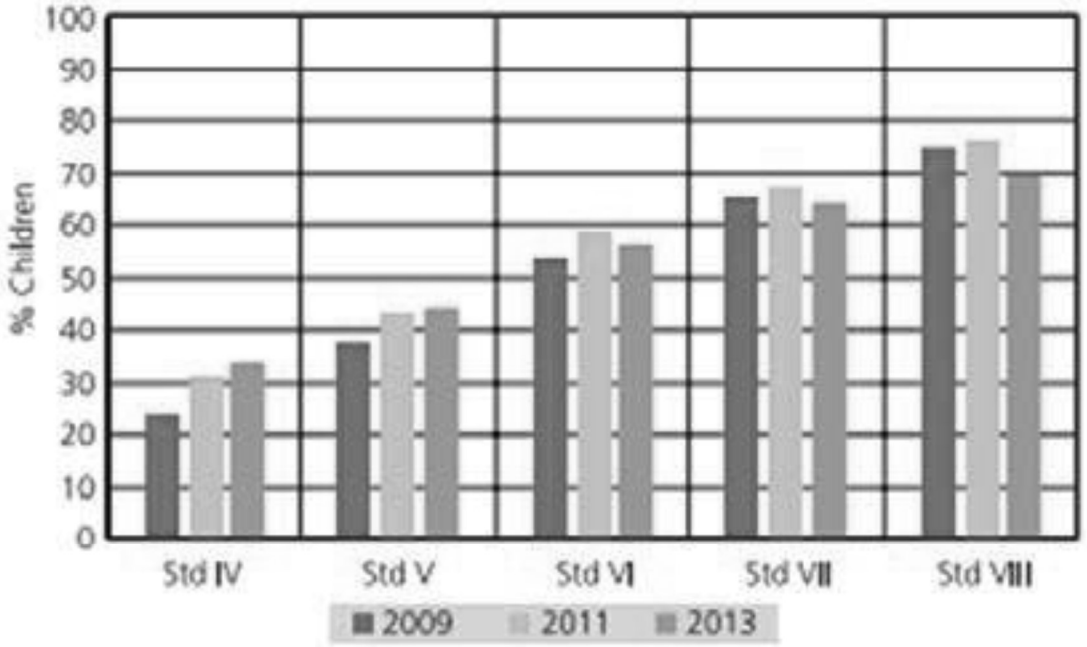
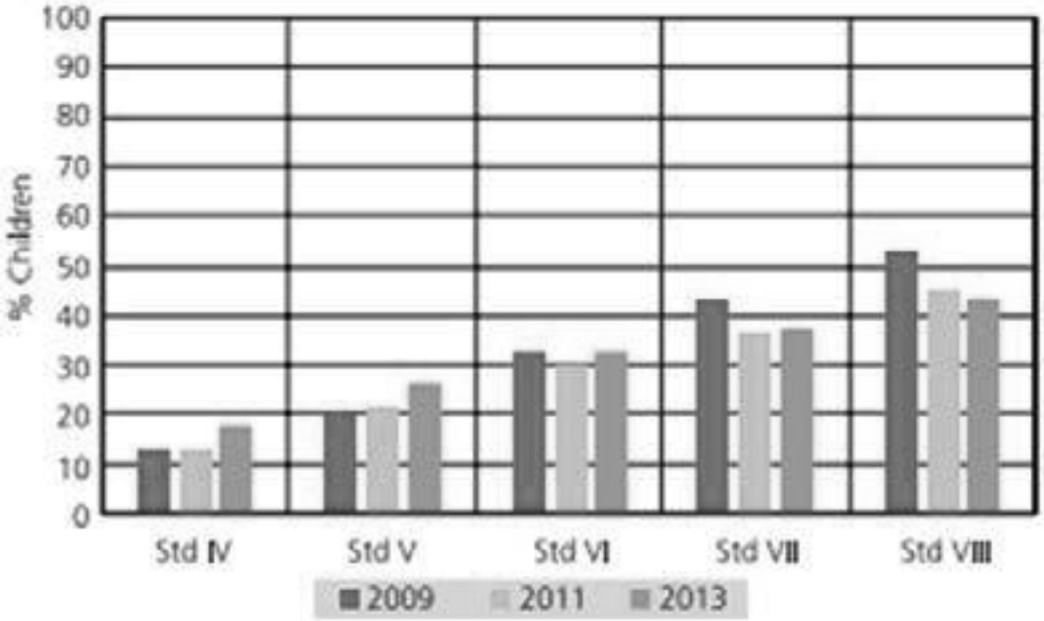


Figure 4: Trends over time: % Children who can do division by class in U.P. (All schools)



Source: ASER Report (2013)

Atherton and Kingdon (2009) points out that para-teachers have an insignificant negative relation with learning achievement in the OLS regressions[6]. While teacher absence has a robust negative effect on achievement, its inclusion in the model does not change the coefficient on the para-teacher variable. This is unsurprising, as in Bihar para-teachers do not have lower levels of absenteeism than regular teachers that we observed in UP.

The above-mentioned observation can be reasoned out. In 2006 and 2007 a large number of para-teachers were hired on permanent tenure in Bihar. Before this event, the terminable 'contract' used to be the crux of the definition of para-teacher. However, these teachers did not have the same academic and training qualifications as the regular teachers and they were paid much less than them (Kingdon and Sipahimalani-Rao 2010). Thus, due to security of job, the low level of absenteeism that the para-teachers exhibited in other states did not hold in Bihar.

Uttar Pradesh

In the same study by Atherton and Kingdon (2009), U.P. presents a picture different from that of Bihar. In the OLS regression, para-teachers have a positive yet insignificant relation with student achievement. A school fixed effects regression shows a positive, significant relationship. This is because an OLS regression allows the para-teacher variable to partly 'pick up' the deprivation effect of the community as para-teachers are more likely to be assigned to bereft areas where households are generally more backward. Why are para-teachers more effective than regular teachers in Uttar Pradesh? The reasoning is stark opposite to that we applied in the case of Bihar- due to their short-term insecure contracts, face greater accountability pressures and thus exhibit more effort than regular teachers.

2. General Conclusion

The para-teacher scheme has raised many concerns about the ethical, legal and political difficulties of sustaining a two-standard employment plan in the system of education. Many scholars have been sceptical about the quality of education provided by the para-teachers. Others have been champions of the para-teacher scheme for its apparent benefits. However, it is difficult to provide a sound appraisal of the scheme as no micro study has been conducted to determine its efficacy.

Most studies have pointed to the fact that on the national level, para-teachers do not have a causal impact on the learning outcomes in the country. However, it is a fact beyond contention that it can be only through the instrument of para-teachers that a rapid rise in the educational attainment of India is possible. As discussed before, this is mainly due to the fact that the para-teacher scheme happens to be a low cost model and does not put a heavy burden on the state exchequer. It is a relatively easier way to reduce the high PTRs across the country as building new schools involves greater investment and takes a lot of time as well. In addition to this, the terminable contracts of the para-teachers prevent them from becoming lax and prevent teacher absenteeism.

6 This regression analysis is not shown in this study. For details refer to Atherton and Kingdon (2009).

It is only in theory that the para-teachers are less qualified as compared to their regular counterparts. It, infact, may be the case that the para-teachers are more qualified than the regular teachers (Kingdon and Sipahimalani-Rao 2010).

The author uses a regression model to study the impact of para-teachers on the learning outcomes. This has its own limitations. First, the small set of observations prevents the author from making any definite assertions. Second, all the variables are not accounted for in the regression. Third, the attendance rates across states are of the year 2007 as current statistics on attendance rates were not available. The author shall try to resolve these issues in a later revision of this paper. However, the analysis presented in this paper, despite being limited, provides a decent indication of the actual state of affairs in the education sector of India and concurs with the studies that were undertaken on a larger scale.

Although Bihar and U.P. are trapped in the same bog of educational deprivation, they presented different pictures in the context of para-teachers. While in Bihar para-teachers were employed as regular teachers but with lower pay-scales, in U.P. they were employed mostly on terminable contracts. Due to this, the learning outcomes due to para-teachers in the two states present different stories. Nevertheless, it can be said with little misgiving that in both the states, the para-teachers have been instrumental in taking education to isolated hamlets where regular schools would have come up much later.

The future of para-teachers

With the advent of the Right to Education Act (2009), all teachers should have attained a minimum level of qualifications as deemed required by the concerned authority on primary education within five years of the initiation of the Act. With the deadline approaching, para-teachers in the real sense of the term should cease to exist. However, the Act does not say anything about contract teachers. In a situation where the para-teachers are on the average more qualified than the regular teachers, this may not pose a big problem. However, the requirement for a teacher training course may be needed, as on the average the para-teachers generally do not possess professional training in teaching (B.Ed. for instance). In any case, the government is facing an acute shortage of primary teachers in the country and thus the para-teachers may go a long way in driving the education sector of India.

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APPENDIX

Indices Used in the Paper

1. **$\text{INDEX}_{\text{TEACHING}}$**

   This index was created by the author on the lines of the Human Development Index (HDI) from indicators pointing at the availability of Teaching-Learning Material (TLM) in the schools. The following indicators were used:

Library Books Available (I_1)

Library Books in Use by Children (I_2)

TLM observed in Standard 2 (I_3)

TLM observed in Standard 4 (I_4)

For each of the indicator, the best and worst values across the states were selected.

Out of this, the individual indices were created using the following formula:

$$I_x = \frac{Observed - Worst}{Best - Worst}$$

The geometric mean of the individual indices was taken to get the $INDEX_{TEACHING}$.

$$INDEX_{TEACHING} = (I_1 I_2 I_3 I_4)^{1/4}$$

2. **$INDEX_{OUTCOME}$**

The following indicators were used in creating the outcome index:

Gender Parity Index in Enrolment

Repetition Rate

Drop-out Rate

Ratio of Exit Class over Class I Enrolment (only at Primary stage)

Transition Rate from Primary to Upper Primary level (only for Upper Primary level)

Percentage of Appeared Children securing 60 per cent and more marks

To understand the methodology, refer to Mehta (2010).

The Editorial Board Recommends

Mohnish Kedia prepared a list of resources for the Editorial Board that should stand any student of Economics, or social sciences in general, in good stead.

Project Syndicate (www.project-syndicate.org)

From Bihar's former chief minister Jeetan Ram Manjhi to the American economist Joseph Stiglitz, Project Syndicate has articles and commentaries by individuals from diverse backgrounds, ranging from statesmen and policymakers to intellectuals and activists. The members include more than 500 newspapers and other publications in 154 countries, and their commentaries reach 300 million readers. To understand the views of people who are shaping the world and how they are doing it, Project Syndicate is a brilliant resource for students of all disciplines.

JSTOR (www.jstor.org)

JSTOR currently provides access to scholarly content to people through a growing network of more than 8,000 institutions in 160 countries. JSTOR includes more than 2,000 academic journals, dating back to the first volume ever published, along with thousands of monographs and other materials relevant for education. For students across all disciplines, JSTOR is an infinite source of scholarly articles. The University of Delhi WiFi provides free access to the repository!

Economic and Political Weekly (www.epw.in)

EPW is a unique weekly journal that publishes analysis of contemporary affairs side by side with academic papers in the social sciences. First published in 1949 as the Economic Weekly and since 1966 as the Economic and Political Weekly, EPW remains one of the most read journals by students of social sciences across the country. The University of Delhi WiFi provides free access to the journal!

World Economic Forum (www.weforum.org)

The World Economic Forum was founded in January 1971 when a group of European business leaders met under the patronage of the European Commission and European industrial associations. The Forum has been the catalyst for a number of significant global initiatives, such as the Global Compact (developed jointly with the UN); the GAVI Alliance (initially the Global Alliance for Vaccines and Immunization); the Global Fund to Fight AIDS, Tuberculosis and Malaria; the expansion of the OECD; and the development of the G20 concept. The forum provides one of the finest content on various pressing issues of development around the world, specially focussing on environment and health.

The Economist (www.economist.com)

Established in 1843 to campaign on one of the great political issues of the day, The Economist remains, in the second half of its second century, true to the principles of its founder. James Wilson, a hat maker from the small Scottish town of Hawick, believed in free trade, internationalism and minimum interference by government, especially in the affairs of the market. Though the protectionist Corn Laws which inspired Wilson to start The Economist were repealed in 1846, the newspaper has lived on, never abandoning its commitment to the classical 19th-century liberal ideas of its founder. A radical magazine, economist provides intellectually stimulating analysis of global economic issues and remains a favourite among the students of economics.

MIT Open Courseware (ww.ocw.mit.edu)

OCW is a flourishing MIT (Massachusetts Institute of Technology) institution and a global model for open sharing in higher education. By November 2007, MIT completed the initial publication of virtually the entire curriculum, over 1,800 courses in 33 academic disciplines, which includes course readings, assignments, videos and tests. Students of economics can find information about more than sixty courses on economics, mathematics, statistics without spending a dime.

The Institute for New Economic Thinking (www.ineteconomics.org)

Situated in the University of Cambridge, The Institute for New Economic Thinking was created to broaden and accelerate the development of new economic thinking that can lead to solutions for the great challenges of the 21st century. The havoc wrought by our recent global financial crisis has vividly demonstrated the deficiencies in our out-dated current economic theories, and shown the need for new economic thinking. The website is a great place to start for students interested in heterodox theories in Economics.

Gregory Mankiw's Blog (www.gregmankiw.blogspot.com)

N. Gregory Mankiw is a professor and chairman of the Department of Economics at Harvard University, where he teaches Introductory Economics. The blog contains his advices to current and prospective students of Economics and his views on latest economic events. The blog is a good source for some light and interesting commentary on various topics in economics.

LSE Public Lectures (www.lse.ac.uk)

LSE's Public Event is the place where some of the most influential figures in the social sciences can be heard. Although it is impossible to be present in London to attend these open lectures, LSE has made it possible for scholars around the world to access videos and podcasts of its public lectures.

Khan Academy (ww.khanacademy.org)

Started by a hedge fund analyst named Salman Khan, Khan Academy offers practice exercises, instructional videos, and a personalized learning dashboard that empower learners to study at their own pace in and outside the classroom. They tackle Mathematics, Science, Computer Programming, History, Art History, Economics, Finance and many more subjects. The website provides free videos on various topics across disciplines, and also allows users to contribute.

EdX (ww.edx.org)

EdX is a massive open online course provider and online learning platform. It hosts online university-level courses in a wide range of disciplines to a worldwide audience, some at no charge. It also conducts research into learning based on how people use its platform. EdX was founded by the Massachusetts Institute of Technology and Harvard University in May 2012. As of 2014, EdX had more than 3 million users taking over 300 courses online. Courses can range from *Academic writing* to *Neuroeconomics* and from a full-fledged course on *R* to *Supply chain Management*. In addition, you receive a digital certificate for your course from the offering university!

Yojana (www.yojana.gov.in)

Published by the Ministry of Information and Broadcasting, *Yojana* is a monthly which contains articles by government officials, politicians and academicians from India and abroad on current issues of social and economic development. One of the most economical and well written sources of information on latest development issues and government policies adopted to tackle them, Yojana is easily available almost everywhere.

Library Genesis (www.libgen.org)

They have more than one million files of non-fiction e-books, nine hundred thousand fiction e-books and more than twenty million papers from journals of Science, History, Arts and Social Sciences. Libgen is one of the best products of communist Russia and provides students with free access to scholarly material.