आpoorti

ARTHASHASTRA · THE ECONOMICS SOCIETY ·

आपूर्ति २०२१

DEDICATION

This edition of Aapoorti is dedicated to all the people who have faced the brunt of the pandemic and the economic crisis due to their gender, class, caste, ethnicity, sexual orientation and/or creed. While last year was tough for most of us, it was especially made worse for certain sections of our society through no fault of their own. The lack of a stable income, food, shelter etc. coupled with the direct risk of being infected by the virus have simultaneously impacted those who have already been denied equality through systematic oppression and discrimination. While the pandemic stands highlighted, structural inequality is inbred in our social and political fabric and we can only try to do our part to enfranchise ourselves and others in this flawed system. We hope to continue to work towards a better and safer society for all.

The Editorial Board

Faculty Advisor's Note

It is a privilege for me to write this note for Aapoorti's 2021 edition. Unlike all the previous years, this eleventh edition has been put together under the unprecedented constraints imposed by the COVID-19 pandemic. The journal, which is entirely driven by the efforts of students, brings together contributions from all over the country, sometimes even from abroad. Over the years, the students have set up an organizational structure so that there is a smooth transition between the batches and all the work gets done in a time-bound way. That, to my mind, is extremely commendable.

The journal includes topics that range from minimum support prices and juvenile crime to less discussed but important issues like emotional labour and placement prospects. The dedication shows the sensitivity towards the disproportionate burden of the pandemic on the different disadvantaged groups. This will go a long way in informing the research agenda and drawing attention towards building an inclusive society. In keeping with the tradition, the journal includes two detailed interviews, conducted online. The team has displayed an exemplary attitude by bringing out an excellent edition as per schedule despite the many demands on their time during the pandemic. They are surely leaving a rich legacy for subsequent batches to admire and emulate.

I congratulate the team for this stupendous achievement under such trying circumstances and hope that this experience has been valuable in enriching their journey in the Economics Department of Miranda House.

Dr. Malabika Pal
Faculty Advisor, Arthashastra

Teacher-in-Charge's Note

The last year has been harrowing for the world due to the covid pandemic. Every sphere of life has been severely hit and we, in academia, lost out on live interaction with our students. There have been health issues, both mental and physical, that the students suffered. Yet, I have been witness to their enthusiasm in myriad ways, be it holding seminars, inviting eminent economists for lectures or undertaking research to bring out the annual issue of Aapoorti.

The theme of the current issue, Gender and Economics, could hardly be bettered. In the current context, the inherent biases against women have been exacerbated. The journal gathers several articles on this theme. The interview with Prof Richard Wolff is refreshing and informative as it delves into alternatives to mainstream economics. Young scholars today are more open to heterodox frameworks.

I congratulate the editorial team for their relentless energy and dedication towards making Aapoorti a success. A special word of gratitude to all the contributors for their opinions on important issues in today's world.

Dr. Ravinder Jha
Teacher-in-Charge, Arthashastra

Acknowledgement

Last year was a trying one for most of us. Hence, putting together our annual journal, Aapoorti, would have been impossible without the diligent efforts of many individuals. First and foremost, we would like to thank our Faculty Advisor, Malabika Pal ma'am, and Teacher-in-Charge, Ravinder Jha ma'am, for their constant support and guidance. We are truly blessed and honoured to have an amazing faculty who always encourage us to do our best even during such dystopian times.
We cannot thank our in-house Marketing Team, the Design Team, the Vishleshan Team, and the Sponsorship Team enough for the dedication and earnestness with which they have worked for this journal. They delivered on their suggestions and contributed immensely to the making of Aapoorti.
This edition's cover art has been designed by Baidehi Roy. It portrays the ethos of this year's theme, Gender and Economy, beautifully.
We are grateful to Mannat Bardia and our deputy editors, Sonali Pan and Shreyanka Pal, for helping us with the typesetting and formatting of the journal. We are deeply indebted to our interviewees for their time and for participating in this annual educational exercise. We would like to thank our contributors from various colleges for their entries and our readers for their unending support.
Our thanks goes out to many more incredible people without whom this edition would not have come into being, we thank you for your kind support.

With gratitude
The Editorial Board

Editors' Note

Aapoorti's eleventh edition has come together in the shadow of the Coronavirus pandemic, which has presented unprecedented challenges to the Editorial Board, much like the rest of the world. We cannot help but feel a sense of pride considering the circumstances in which our contributors and teammates have worked, with relentless focus on carrying a legacy of excellence and quality publication.

Our theme for this year is 'Gender Economics'. While gender has always been at the root of much disenfranchisement in the world, it has once again come to the forefront: the brunt of the Coronavirus-19 pandemic has been borne along gendered lines. Female job loss rates are 1.8 times higher than male job loss rates worldwide (McKinsey & Co.), the burden of unpaid care and domestic work on women has increased and so have calls to domestic violence authorities (UN Women). This has prompted a deeper examination of the cyclical relationship between gender and economics. Our editors this year have undertaken research on a wide array of subjects: from harkening back to the Great Depression to understand the origins of the term 'gold digger' to examining the gender gap within academia. Our foray into these areas has added a great degree of nuance to our own views on the same, and we hope that it does the same for our readers.

We have interviewed eminent economists such as Dr. Richard Wolff, whose work is especially relevant as the world casts a questioning eye on capitalism in the wake of the crisis. In an aim to bring more diversified (and youthful!) perspectives to our journal, we have also interviewed Ronak Jain, a PhD candidate in Economics at Harvard University.

We hope that this edition of Aapoorti is as enriching for you to read as it was for us to create and compile.

With warm regards
The Editorial Board

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EDITORS' DESK

Do the Preconditions of Market Exchange of the Sexual Economics Theory Apply in the Indian Marriage Market?

By Bharati J. Krishnan, Medha Arora and Shreyanka Pal

Abstract

The purpose of this paper is to analyse whether the preconditions of market exchange of the paper "Sexual Economics: Sex as Female Resource for Social Exchange in Heterosexual Interactions" apply in the Indian context. A highly controversial paper, it studied the dynamics for heterosexual relations through the economic tools of supply and demand. We first went through the history of mate-selection in India, followed by an analysis of the demands of men and women from their current/prospective partners. The results of our study show that three out of four preconditions of market exchange required for the theory don't apply in the Indian context. We have also included the general criticisms of the paper.

Keywords: Sexual economics, Indian marriage market, Patriarchy, Gender inequality

Introduction to Sexual Economics Theory (SET)

The research paper "Sexual Economics: Sex as Female Resource for Social Exchange in Heterosexual Interactions" (Baumeister & Vohs, 2004) tries to explain the market for heterosexual relations (before marriage) through the economic lens of supply and demand. It proposes that women are the primary suppliers and men the demanders of sex. Men purchase sex from women through either monetary or non-monetary resources and women regulate the market for sex through various measures aimed at keeping the price of sex high. Women can control the supply of sex because they have a lower sex-drive than men (according to another paper (Baumeister & Vohs, 2001) written by the authors in 2001). Hence, according to the "principle of least interest" in Social Exchange Theory (Cook, 2015, 341 - 342), women have a higher power to dictate the supply of the commodity, i.e., sex.

According to the paper:
"Cultural systems will tend to endow female sexuality with value, whereas male sexuality is treated by society as relatively worthless. As a result, sexual intercourse by itself is not an equal exchange, but rather

an instance of the man getting something of value from the woman. To make the exchange equal, the man must give her something else in return and his own sexual participation does not have enough value to constitute this."

The man can offer a variety of things to the woman in exchange for sex: material gifts, financial security, respect, the promise of a relationship, social clout etc.

Table 1. *Factors Influencing Sexual Exchange*

Factors	Effect on Price of Sex
Preconditions of market exchange	
In general, men want sex more than women want sex	
In general, men have resources women want	
Women are free to make sexual decisions	
The man and woman live in a culture in which information about others' sexual activities is known or hinted about, so that each person knows the current market price	
Individual factors	
Woman's age is past young adulthood	Lowers
Woman is unattractive	Lowers
Other women also want the man (competition)	Lowers
Woman has high sex drive	Lowers
Man has much higher status than the woman	Lowers
Woman lacks alternate access to resources	Lowers
Woman has had many prior sexual partners or has the reputation of having had many sex partners	Lowers
Woman is attractive	Raises
Woman is in young adulthood	Raises
Woman wears sexy clothing	Raises
Other men also want the woman (competition)	Raises
Man has high sex drive	Raises
Woman has had few or no prior sexual partners, or has the reputation of having few or no sex partners	Raises
Market factors	
Larger pool of women than men (supply exceeds demand)	Lowers
Permissive sexual norms (low market price)	Lowers
Men have easy access to pornography or prostitutes (low-cost substitutes)	Lowers
Larger pool of men than women (demand exceeds supply)	Raises
Female collusion to restrict men's sexual access to women (monopolistic manipulation)	Raises
Men have few opportunities for sexual satisfaction	Raises

(The above picture is of Table 1 from the paper. It lists the preconditions for their theory to work and the factors that they have assumed would impact the price of sex.)

Criticisms of the Sexual Economics Theory

Laurie A. Rudman and Janell C. Fetterolf in "Why Sexual Economics Theory Is Patriarchal: Reply to Vohs and Baumeister's (2015) Comment on Rudman and Fetterolf (2014)" summarize how their research undermines the three central tenets of the theory 1) that women (not men) are responsible for suppressing female sexuality, 2) women are more invested in sexual exchange than men are, and 3) that men like sex more than women, which affords women a bargaining chip.

Both evolutionary psychology and feminist theory predict that men are largely responsible for suppressing women's sexuality. Baumeister and Vohs reason that women have more to gain than men from restricting female sexuality because "it is always within the best interests of an oligopoly of sellers to restrict the supply of its product" whereas "men will tend to support initiatives that lower the price of sex".
In other words, women are more invested in sexual exchange than men are. But Rudman & Fetterolf found that, compared with women, men were more likely to automatically associate sex with money, and endorse hostile sexism. Vohs and Baumeister ignore how this data undercuts SET's core thesis that women are responsible for female sexual suppression because they are invested in sexual exchange. Instead, men are more likely to sexually restrain women and support sexual exchange because men are more invested in patriarchy. SET claims that men mainly want sex from women and fails to take into account that men also desire money, or even affection, attention, time, commitment, and children.

The third basis for sexual exchange is that men like sex more than women but it was noted that gender differences are uncertain when response biases are ignored. Using an attitude Implicit Association Test with photos of sexually engaged couples, Rudman and Fetterolf found similarly robust liking for sex on the part of both genders, adding to a literature that Vohs and Baumeister ignore. They also ignore patriarchal reasons why men report liking sex more than women. The SET can also be seen as objectifying and dehumanizing to women by regarding the female body as a commodity for male satisfaction and entitlement. Furthermore, it encourages and reinforces "slut shaming" and other restrictions towards sexual freedom by dismissing the idea of sexual pleasure for women. (Rudman & Fetterolf, 2015)

Marriages in India

History

In India, marriage has been considered synonymous with arranged marriage owing to social structures, and has been a part of Indian culture since the fourth century. Arranged marriages were seen as a way to maintain caste purity and ensure control and consolidation of family property. It was typically arranged between families with similar social status and wealth. Since the union was majorly determined by parents and family elders, the bride and groom often didn't have a choice in who they were marrying, especially the woman. Most families were patriarchal and patrilineal, with the oldest male member as the dominant head of the family. Several social evils like child marriage, sati and female infanticide were practiced. Girls were married off at ages as young as 8 to husbands who were either children themselves or 30-40 years older. The girl is seen as `paraya dhan' (someone else's property). It was argued that the nature of a Hindu family rests with the integration of a woman with her husband and his family and it was only possible for her to look at them as her own if she grew up with them. Therefore, her whole socialization process remains constructed as one long preparation to be a good wife and a good mother. Throughout her life, a woman is viewed as property that is transferable - father to husband to son. (Dutta, 2016).

While the extent to which it was practiced is unclear, sati was a horrific and barbaric tradition in which a widow sacrifices herself by sitting atop her deceased husband's funeral pyre. It was often enforced by family members who ostracized women who managed to escape or failed to sacrifice themselves.

An important and prevalent customary practice was that of dowry. Still widely practiced despite prohibitive laws, dowry was a `gift' given by the bride's family to her in-laws. Hindus believed that kanyadaan, `the gift of a virgin' was a pious duty. To complete the ritual of kanyadaan, according to religious requirements, made it obligatory on the parents to give something more besides the bride. Marriage thus implied the gift of a daughter decked and bejewelled with expensive ornaments and other presents which were intended for her comfort and better status in her in-laws' house. Everything depended, however, on the financial capabilities and position of her parents.

The "upper caste" women needed to bear legitimate heirs to "high caste" men, especially the rich and propertied. Their sexuality needed to be tightly controlled to sustain the class system. On the other hand, a "lower caste" woman's sexuality is accessible to be appropriated and for the use of "upper caste" men. (Chaudhuri, n.d)

In Islam too, marriages were arranged by the parents of the bride and groom. But unlike most Hindu marriages, they were endogamous and polygamous. At the time of marriage, a gift is given by the groom to his bride as a mark of respect and is called mahr. This will always remain her personal asset. Other variations in marriage practices can be seen among various ethnic and tribal groups in the central, mountainous north and eastern regions. The Khasi and Garo tribes in Meghalaya are examples of societies that follow the matrilineal law of inheritance. (India Today, 2016).

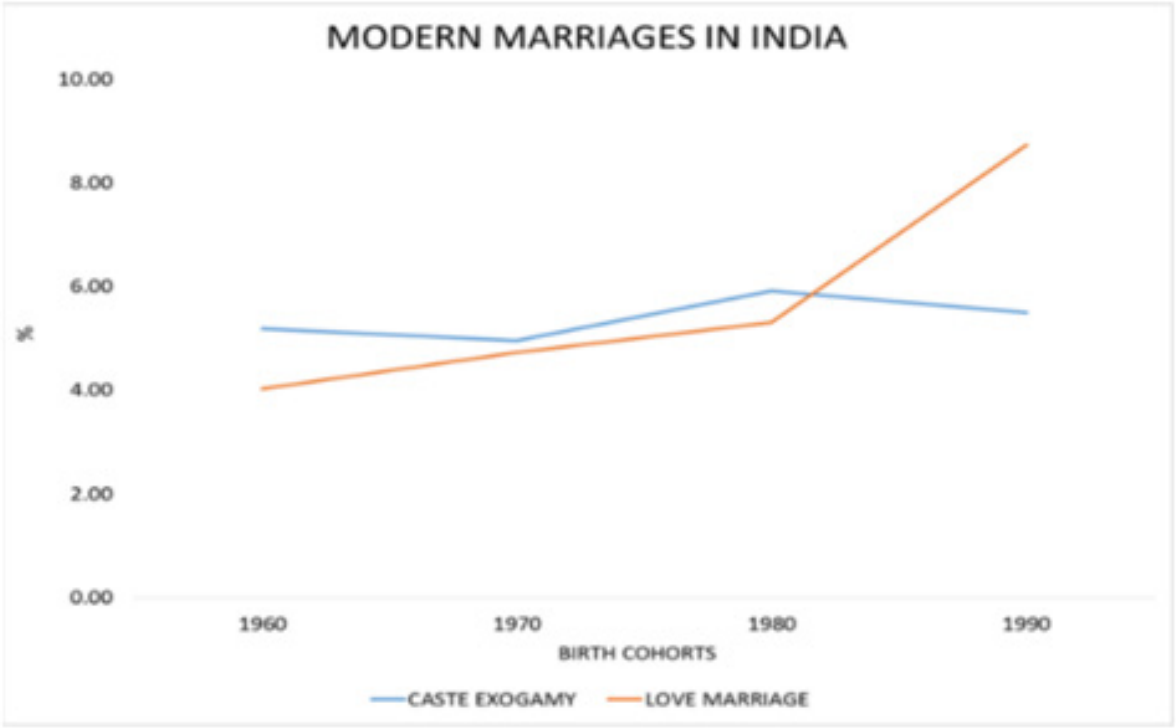
Present Scenario

In the past several decades, the marriage system in India has experienced a number of changes.

The degree of control exercised by the families appears to be waning over time, and there has been a rise in the incidence of elopements and "love marriages". The trend for love marriage is increasing across all birth cohorts, it has almost doubled from 4.5% in the 1960 cohort to 8.9% in the 1990 cohort (Figure 1). The odds of love marriage are higher for Scheduled Tribes, North-East and East regions. (Sarkar & Rizzi, n.d.)

Nevertheless, arranged and intra-community marriage remains the dominant nuptial form across the country, from the most remote rural villages to the bustling urban municipalities. However, there is an emerging acceptance of inter-community marriage in contemporary India that challenges traditional conceptions of geographic and cultural boundaries. This acceptance remains limited to the urban cosmopolitan population where socio-economic and cultural divisions are more likely to be fluid.

But, with inter-caste marriages constituting a mere 5.8% of all marriages, a number that has only marginally changed in the past 40 years, and with communalist sentiments hindering those who wish to marry out of caste, creed or religion, the unorthodox practice of inter-community marriage, arranged or love, continues to be viewed with skepticism or as a sin (Chager et al., 2010).



Change in the the ratio of caste exogamy and love marriage across the 1960-1990's birth cohorts

The Indian Marriage Market

What do Indian men and women demand from their partners?

If marriage is to be considered as a market, then it makes sense to consider the demands of the consumers, i.e., people seeking a husband/wife. While preferences on the basis of, let's say, personality, education, "attractiveness", etc., do matter, other factors such as caste and religion also play a central role.

The paper "Who Marries Whom? Changing Mate Selection Preferences in Urban India and Emerging Implications on Social Institutions," (Prakash & Singh, 2014) discusses the changes in preferences of men and women over generations regarding their partners.

Table 2 Descriptive statistics for preferences of younger and older generation population, by sex

Preferred characteristic of mate	Men						Women					
	Younger generation			Older generation			Younger generation			Older generation		
	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank	Mean	SD	Rank
Physical attractiveness[b]	2.57	0.76	2	2.53	0.83	4	2.56	0.70	5	1.78	1.08	9
Good financial prospect[a,b]	2.54	0.74	3	1.00	0.85	11	2.75	0.59	1	2.50	0.85	3
Pleasing nature[a,b]	2.18	0.95	9	1.50	1.02	10	2.35	0.73	8	1.97	1.03	6
Same liking[a,b]	1.77	1.00	11	1.00	1.07	12	2.32	0.82	9	1.85	1.01	8
Socially popular[b]	1.09	1.11	15	0.71	1.20	14	2.17	0.87	11	1.46	1.10	10
Similar educational background[b]	1.85	1.05	10	1.57	1.16	9	1.80	1.09	14	0.85	0.78	15
Similar job/earnings	0.76	0.98	16	0.36	0.74	16	1.08	1.03	16	0.76	0.97	16
Economically even and stable[a,b]	1.69	0.95	12	0.92	1.04	13	2.00	0.78	12	1.32	0.91	12
Ambitious[a,b]	1.38	1.11	14	0.38	0.77	15	1.93	0.83	13	1.28	0.91	13
Mutual attraction and love[b]	2.35	0.75	6	2.08	0.95	7	2.26	0.86	10	1.42	0.97	11
Domestic skills[a,b]	1.69	0.99	13	2.94	0.25	3	1.50	1.05	15	0.90	0.97	14
Good health[b]	2.39	0.70	4	2.44	0.81	6	2.39	0.80	7	1.92	1.00	7
Intelligent[a,b]	2.29	0.83	7	1.67	1.29	8	2.70	0.59	3	2.16	0.92	5
Faithful/dependable character[b]	2.67	0.62	1	2.47	0.64	5	2.77	0.53	2	2.41	0.90	4
Same caste[a]	2.27	1.09	8	3.00	0.00	1	2.49	0.85	6	2.73	0.76	2
Same religion[a]	2.37	0.98	5	3.00	0.00	1	2.62	0.73	4	2.81	0.63	1

[a] Differences in preferred characteristic of mate among men of younger and older generation are significant at 5 % level of significance

[b] Differences in preferred characteristic of mate among women of younger and older generation are significant at 5 % level of significance

(Table 2 from the paper; the highlighted characteristics are the most preferred ones. The ones in pink are the top ranked characteristics for the older generation and the ones in blue are the top ranked characteristics for the younger generation.)

They write:
"Findings unfold significant differences in various preferred attributes about their partner across the two generations... Compared with men from the older generation, younger generation men preferred to have wives with good financial prospects, a pleasing nature, economic stability, and who are ambitious and intelligent. In contrast, older men preferred wives who came from the same caste and religion and who had domestic skills. Similar to men, women belonging to the younger generation differed from women in the older generation in their greater preferences for their husbands with good financial prospects, faithful/ dependable character, intelligence, and physical character. However, there were no significant differences between younger and older women in the importance they attached to religion and caste." Hence both men and women from the younger generation preferred partners with "good financial prospects".

Who are the primary negotiators?

A 1993-94 survey confirmed over 97% of married rural women aged 15-39 years did notdon't have a say in the choice of their husbands. Additionally, a 2018 survey (Sirur, 2018) proved that increasing the husband's mother's education would boost inter-caste marriages in the country, affirming the belief that parents are a major determinant of marriages in India.

Even today a clear majority of Indians first meet their spouses on their wedding day. In India women have a very limited role in choosing their husbands and in decisions regarding marriage practices and customs to be followed. However, women belonging to Scheduled Tribes and the Christian community seem to be better off than other women – with respect to choosing their husbands themselves and knowing their spouses for a considerable period prior to the wedding. The education status of a female also plays a key role in how much autonomy she has while deciding who to marry. The involvement of a parent's decision on the selection of spouse is preferred due to his/her knowledge and wisdom in selecting a good spouse which apparently ensures greater stability and security than love marriage. A study noted that parent-arranged marriages have been substituted by semi-arranged other than self-arranged marriages.

Hence, although women belonging to some special groups – STs, Christians, those who have received higher education – do have a say in who they wed, the general consensus, however, deem the parents to be the primary negotiators (Soy & Sahoo, 2016).

Preconditions of Market Exchange

Precondition 1: Men want sex more than women want sex

The Sexual Economic theory as presented by Baumeister and Vohs assumes that men have a higher sex drive than women.

A number of studies, including one conducted by Baumeister, show that men's sex drives are not only stronger than women's, but much more straightforward. The sources of women's libidos, by contrast, are much harder to pin down. A number of reasons like difference in psychological states, response to drugs and openness to new experiences between the two genders have been stated as reasons for this asymmetry (Sine, 2013). In his review, Baumeister found studies showing many ways in which women's sexual attitudes, practices, and desires were more influenced by their socio-cultural environment as compared to men. Lauman believed that men have every incentive to have sex to pass along their genetic material. By contrast, women may have to choose their partners carefully, because they are the ones who can get pregnant and wind up taking care of the baby.

On the other hand, alternative theories proved how previous studies have been fundamentally flawed – biased under patriarchal conditions. An experiment conducted by Dr. Terri Fisher in 2013, that asked undergraduate students to complete a survey on their masturbation practices, porn use, and number of sexual partners, proved that surveyees tend to misrepresent their sexual behavior to match the cultural expectations of men and women (Novotony, 2013). According to the survey, on average women had a higher sex drive when they answered questions anonymously as compared to when they were named. Men, however, had relatively similar results.

Thus, there has been no definitive conclusion on which gender has a higher sex drive. While some believe it is men, others hold the opinion that the drive differs for person to person and gender is not a determinant.

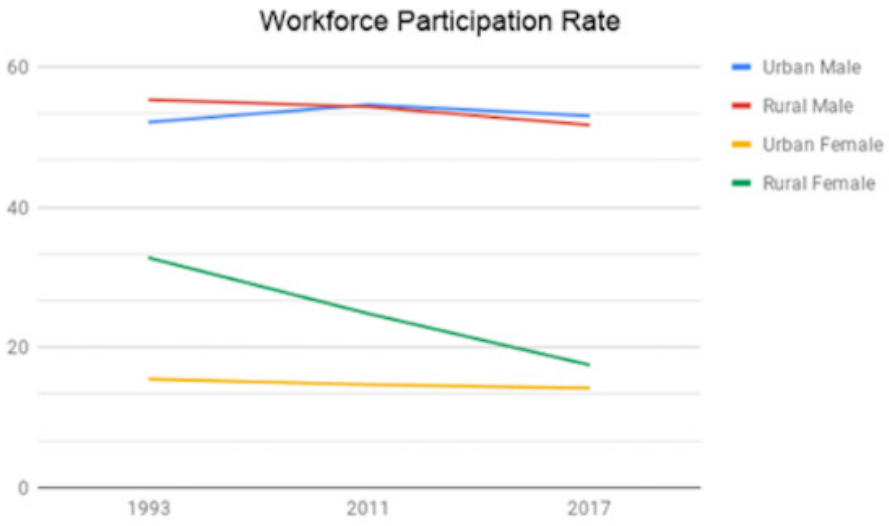
Precondition 2: In general, men have resources women want

Patriarchy and patrilineality have assured that men, right from birth, have access to property and family wealth, while women solely depend on their fathers, husbands and sons for resources and survival. Education as a resource too, was made somewhat accessible to women only after the social reforms of the 19th century, after much opposition. Even after educational reforms, campaigns and changes in laws regarding succession and land ownership rights of women, etc. women are still heavily economically dependent on men.

The enrolment of girls in higher education increased from 39% to 46% from 2007 to 2014, but female participation in India's labour force declined to a low of 27% in 2014 from 34% in 1999, according to a 2015 study by the International Monetary Fund. When the gender parity index – the ratio of female students to male students – in higher education rises, it should lead to higher female labour force participation rates and the resulting human-capital accumulation should boost potential output. However, the percentage of women in India's workforce is declining (Das et al., 2015).

The decreasing participation of women in the workforce can be attributed to socioeconomic and structural reasons. Even if they are educated, many women are not allowed to work by their families. It is implicit among most families that a woman's primary role is to take care of the house and her family and any income generating work is secondary to this role. Women who do join the workforce often need to take extended leaves for maternity and child care, and even the healthcare of other family members (The Hindu, 2019).

Fewer Women Are Participating In The Paid Workforce



Source: Periodic Labour Force Survey (PLFS) 2017-18

Women who choose to and are able to work after marriage are often overburdened with responsibilities inside and outside the house. In addition, they are treated unfairly at work, not offered equal pay and promotional opportunities as their male counterparts and often face sexual harassment. With wage discrimination, pressure from families to focus on housework, lack of institutional support for child care and constraints on mobility, the incentives to work and returns on education for women are extremely less. The gender pay gap in India, a measure of the gap in the overall earnings of men and women is thus very wide. According to the latest World Economic Forum's (WEF) Global Gender Gap Report 2018, India ranked 108th out of 149 countries on the gender gap index. According to the Monster Salary Index (MSI) published in March 2019 (Monster India, 2019), women in the country earn 19% less than men. The survey revealed that the median gross hourly salary for men in India in 2018 was 242.49, while 196.3 for women, meaning men earned 46.19 more than women.

According to the survey, the gender pay gap spans across key industries. IT services showed a sharp pay gap of 26% in favour of men, while in the manufacturing sector, men earn 24% more than women (The Hindu, 2019). A study conducted by Oxfam placed the country's gender pay gap at 34% (Oxfam India, 2020).

Land, in particular, is an important resource because it generally provides food, shelter and income security. Women comprise over 42 percent of the agricultural labour force in the country and yet they own less than 2 percent of its farmland. According to the India Human Development Survey (IHDS) which was a nationwide panel survey conducted in two waves, 2004-05 and 2011-12, irrespective of laws ensuring women's rights to agricultural land, most such land is owned by either men or undivided families. IHDS found that 83 percent of agricultural land is inherited by male members while women inherit less than 2 percent. The numerous barriers in land ownership that Indian women face include lack of legal awareness about their inheritance rights, reluctance to claim property from hostile family members which often leads to conflict and isolation and the biased implementation of laws further fuelling gendered social discrimination. One of the primary reasons for this is that the intervention of women's land rights in India is carried out through various old personal laws and customary practices. These have already been established, and often take precedence instead of legal discourse (Mehta, 2018).

It is largely evident that because of low levels of economic independence among women in India, they depend on men for resources.

Precondition 3: Women are free to make sexual decisions

Relationships in India have almost always been equated to heterosexual, monogamous marriages, arranged by parents and family members. Relationships and sex outside of marriage, even in cultures that accept polygamy do not fit into the country's social norms and are generally frowned upon. Data suggests that pre-marital sex is still a taboo across the country. Only about 11% of single men and 2% of single women in the 15-24 age-group reported having had sex. (However, figures are based entirely on self-reported data, and it is difficult to gauge the extent of false reporting.) (Kundu & Bhattacharya, 2018)

Intrinsically tied to the concept of arranged marriages is the deeply entrenched system of caste and patriarchal-patrilineal property coupled with reproduction and fertility. Sex was also seen as a duty of a woman for her husband's pleasure that she had to fulfil and couldn't refuse. Marital rape is still not recognized and criminalized in the country. About one in six women (16.9%) believe a wife is not justified in refusing sex with her husband even if he has a sexually transmitted disease, or if he has multiple sex partners, or if she is tired or not in the mood. Less than one in six men (14.7%) shared the same view, data showed. Further questions to men on women's sexual rights in a marriage revealed nearly one in 10 (9.2%) believe that men can force themselves on their wives while 8.9% felt that a wife's refusal justified extra-marital sex (Saldanha, 2018).

Prior to marriage, a man's sexual experiences, decisions and partners are not questioned, they are in fact, bragged about and don't affect his rights to property since it could only be passed on to a `legitimate heir'. On the other hand, conversations about an Indian woman's sexuality, if they exist, judge and label her based on her sexual experiences and could even cost her a matrimonial prospect. Ancient Hindu rituals like `kanyadaan' applaud women's virginity as a sign of purity, integrity and piety. Despite increasing education levels, men still want virgin brides. A fundamental principle of Hindu social organization is to create a closed structure to preserve land, women and rituals within it. The three are structurally linked and it is not possible to maintain all three without the stringent control of female sexuality, or rather upper-caste female sexuality. Brahminic patriarchy ensures purity in the bloodline of upper-caste men by controlling the sexuality of upper caste women. It isn't concerned about the sexuality of lower caste women, who get termed as `loose', `vulgar' and `sexually promiscuous' while their sexuality is made accessible to upper caste men. On the other hand, Brahminic patriarchy, consistent with scriptures such as Manu smriti strictly `guards' upper caste women from lower caste men to sustain the patriarchal caste system. Women's co-operation in the system was secured by ideology, economic dependency on the male head of the family, class privileges and the respect given to conforming and dependent women of the upper classes, and finally the use of force when required (Chakravarti, 1993).

Female sexuality was thus not seen as distinct from motherhood within a tightly controlled structure of reproduction which ensured caste purity (by mating only with prescribed partners) and patrilineal succession (by restricting mating only with one man). Women in India did not have reproductive rights either, since motherhood was glorified and infertility seen as a curse; contraceptives and the knowledge of their usage along with abortion rights were not accessible in the past. Although women's movements in the country and women's struggle for control over their fertility has led to a separation between sexuality and reproduction, it is not widespread. According to the National Health Survey 2015-16, the need for contraception stands at 13% and the use of modern contraceptive methods stands at under 50%. 1 in 7 married women report that they no longer want to get pregnant but are not currently using any form of contraception. When it comes to agency, a study in rural areas of Rajasthan finds that for young women, the taboo around contraception and sex for non-reproductive reasons is largely insurmountable; therefore, (unsafe) abortion is an easier avenue to exercise one's agency than seeking contraception (Privacy International, n.d.).

Among married 15–19 year-olds, only 40% reported that they had sole say over their own health care or made such decisions jointly with their husband; for the remaining 60% of married young women, their health care is not in their control (Guttmacher Institute, 2014).

Owing to India's diverse cultures, the situation also differs across regions. Region is a strong predictor of autonomy. A woman with the exact same household wealth, caste and religion will likely have more autonomy if she lives in the South. Southern and North Eastern women are more likely to be educated, marry later, choose their own husbands, interact more closely with their husbands, bear fewer children, own more assets in their communities and work alongside men. In North and North-West India, women are much more constrained (Evans, 2020).

Muslim women face oppression on two fronts. Where one, they face challenges from Muslim men and patriarchal structures. On the other side, sexual practices, the attitudes of dominant communities and their perception of Muslim women dictate their sexual decisions. While the limits are defined by the Muslim patriarchal systems, they are reinforced by marginalisation and the lack of social mobility facilitated by majoritarian governments which use social and legal instruments of control over their sexual autonomy (Khan, 2020).

While media and women's movements have started conversations around women's sexual autonomy, it is still tightly controlled by caste, class and patriarchal structures, whether Brahminic or Muslim, and considered indistinct from reproduction. More recent trends and attitudes haven't been analysed, however there is some change. For instance, Outlook magazine in 2003 revealed that more than one out of two women surveyed across 10 cities felt that sex was as important to them in a relationship as it was to a man. And, nearly seven out of every 10 women believed that they were more comfortable with their sexuality now than they were even five years previously (LiveMint, 2018).

Another study (Avasthi et al., 2008) interestingly showed that "many of the participants displayed positive dispositions toward greater sexual assertiveness and a wide range of sexual activities. These findings, contrary to the traditional prototype of the Indian woman, may be explained partly in the light of younger age and urban preponderance in the sample; however, the possibility of an evolving social change in female sexuality is pertinent."

But largely, conjugal and familial systems construct women in such a way that they hardly live as independent beings and they are seen only in relation to men, depriving them of their selfhood and agency.

Precondition 4: The man and woman live in a culture in which information about others' sexual activities is known or hinted about, so that each person knows the current market price

Indian society, as discussed above, is conservative. Hence, it is highly unlikely that information about others' sexual activity would be known by people.

In a research paper on "Changes in HIV knowledge, and socio-cultural and sexual attitudes in South India from 2003-2009," the researchers found that there was an increase in the belief that "access to condoms promotes promiscuity" and that "sex education promotes sexual activity and promiscuity" by both men and women. In fact, young women increasingly believed that "it is wrong to talk about sex" and that it is "wrong to talk about AIDS in a respectable family".

In another study done in Metropolitan Delhi, it was again found that: "attitudes to sex and variant sexual practices remain broadly traditional and conservative and there remains a remarkable gender difference in the attitudes".

Hence it is fair to say that in the Indian context, it would be wrong to assume that people are aware about the sexual activities of others around them.

Conclusion

The key takeaway from this paper is that three out of the four market exchange preconditions of the paper on sexual economics by Baumeister and Vohs don't apply in the Indian context. Hence it is not rational to use this theory to explain the Indian marriage market. This is not to say that the theory should be applied to explain the marriage markets of other countries. We have included a list of criticisms of the theory that was authored by an American professor (Laurie Rudman). Analysis of the history of the Indian marriage market points to the existence of practices like child-marriage which imply that girls were never given much authority over their bodies. Practices like Sati don't align well with the supply-demand approach to marriage. Hence, in India the existence of patriarchy had an overbearing effect on how marriages were arranged.

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Other Things Being Unequal: The Gender Gap in Academic Publishing

By Devika M., Sonali Pan

Abstract

This paper explores the gender distribution of authors that publish in Indian economics journals. We do that in two ways- first, we examine student-run, undergraduate economics journals of Indian colleges and second, we examine leading Indian economics journals as research usually starts at the undergraduate level and continues in the professional sphere. We use Python libraries to scrape data from the journals' websites and assign genders based on author names. The results show that while men and women have an almost equal representation at the undergraduate level, representation drastically falls at the professional level. Possible reasons as to why this occurs are discussed. We also analyse trends in collaborations between authors.

Keywords: Women; Research; Gender Inequality; Academia

JEL Classification: I230, I240, J710

Background

Women are underrepresented in academia through a variety of ways. Research has found that women in academia are less likely to be published, are cited less often, receive less credit for papers co-authored with men, are more likely to be underestimated by their male peers, are underrepresented in editorial boards of journals, receive lesser money and prestige after winning prizes for their research, and are paid lesser than men even after accounting for age and research performance. A recent study found that the Covid-19 pandemic might also be causing women to publish less research and start fewer new projects since they have to take on more care responsibilities than men.

In the field of economics in particular, female authors were subjected to higher levels of evaluation and had their work rated lower, subjected to higher standards during peer review, and were less likely to achieve and take longer to achieve tenure track positions. A survey by the Chicago Booth Review with 9,000 respondents, who were a part of the American Economic Association, indicated 'a climate of discrimination' against women in economics.

In our study, we analyse the proportion of women and men in economic research papers published in top economics journals both at the undergraduate level and at a professional level.

Methodology

The study was conducted at two levels-

I. Undergraduate Level

II. Professional level

Undergraduate Level

NIRF, popular websites', and magazine rankings were parsed to collect a list of colleges that offer undergraduate courses in economics. Very few colleges were found to have journals dedicated to economics that are run by undergraduate students and publish undergraduate research, articles, and academic writing. Though some college journals did not publish research papers, their contents were considered to represent an interest in and aspirations of academic writing and so the gender-wise participation in them can be considered to represent the space different genders receive in undergraduate research. Only co-educational colleges were considered in the study as it was felt that in-house submissions in girls colleges would end up outweighing submissions from outside the college in the journal since the entire editorial team would be composed of women. Contributors to each journal were counted. Each contributor was given equal weightage regardless of whether they were co-authors or authored the paper alone. In case of the same author contributing twice in two different papers, they were counted as two different contributors of their gender. The period of study was from the academic sessions 2014-15 to 2019-20.

Professional Level

At the professional level, 10 Indian economics journals were chosen. These were ranked as the top 10 journals by Tilak Mukhopadhyay and Subrata Sarkar in their paper titled Rankings of Economics Journals and Departments in India. Editions from each journal from the year 2016 to the year 2020 were considered. Contributors were counted year-wise as well as journal-wise to find the gender distributions. The gender distributions of single-authored papers and their numbers as compared to papers written in collaboration were also determined.

We ran html scraping code over all the webpages to access paper titles and author names. We used BeautifulSoup, which is a Python library, for pulling the relevant data and lxml API for parsing. We used the journals that were published on Springer, Sage Journals, Jstor and the websites of the journals themselves.

Limitations

The biggest limitation in both parts of study is that of misgendering. Only two genders were taken into account, and the authors were fit into either Male or Female depending on their names (if mentions of their genders/pronouns were not found on the internet). This method misgenders both those who do not identify as a part of the gender binary and those whose gender does not align with the gender their name is usually associated with.

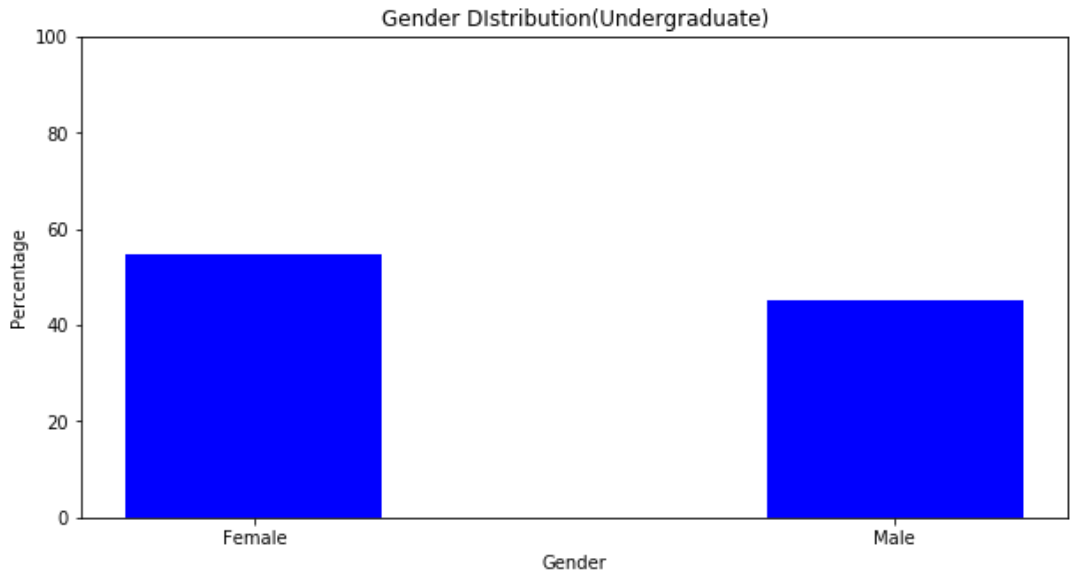
Undergraduate journals

For the undergraduate study, the total number of editions analysed was 22, the total number of papers was 319, and total number of authors was 411. This is quite a small number and a case could be made that these cannot be taken as representative of research spaces in economics at the undergraduate level across the country.

Since only issues available online were considered, the colleges are concentrated in metro cities and again cannot be representative of the entire country.

Findings

At the undergraduate level, the 319 papers studied showed that 225 or almost 55% of the contributors were women.

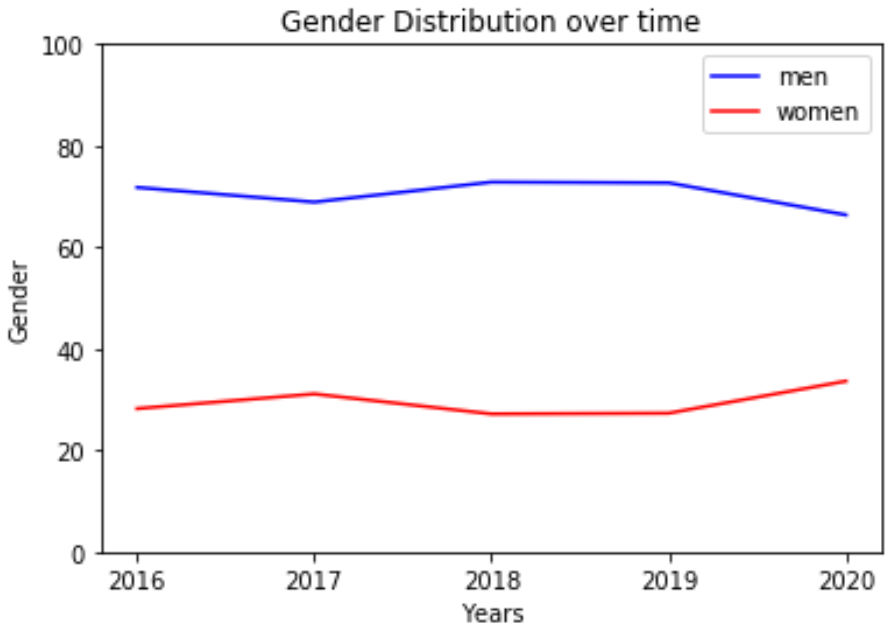


	Women	Men	Total
Distribution	225	186	411
%	54.7%	45.3%	100%

This represents an almost equal distribution with a slight tilt towards women. Although more women enroll in undergraduate courses according to the All India Survey of Higher Education (AISHE) reports of the past few years, the sample set of journals consists of mostly colleges under the University of Delhi, which have had a gender ratio skewed towards men for years. For instance, the student body of Kirori Mal College, one of the colleges whose journals was studied, comprises of only 30% women.

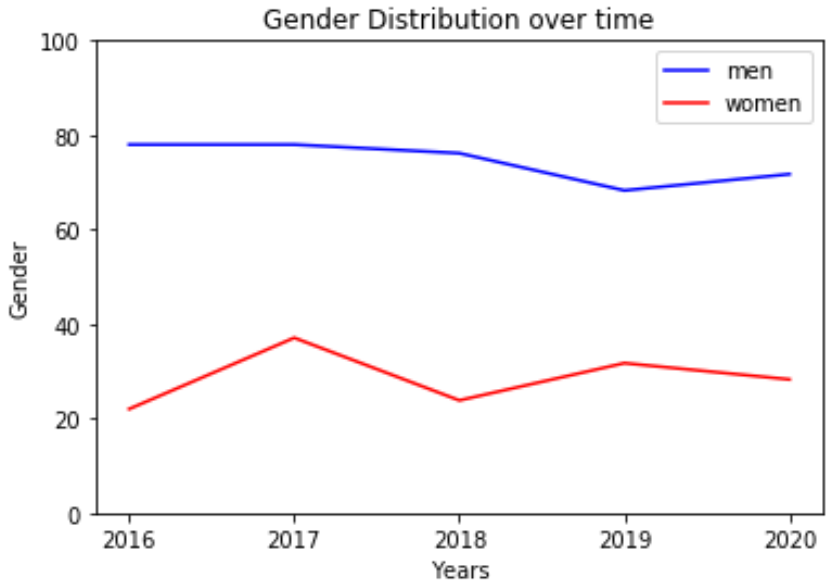
At the professional level, however, the rate of women was found to be much lower. Across the 50 issues of the 12 journals, more than 1,300 papers and more than 2,300 authors were covered. It was found that women contribute less than 30% as a whole.

	2016	2017	2018	2019	2020	Total
Men	341	319	362	338	302	1662
%	71.8%	68.9%	72.8%	72.7%	66.4%	70.6%
Women	134	144	135	127	153	693
%	28.2%	31.1%	27.2%	27.3%	33.6%	29.4%

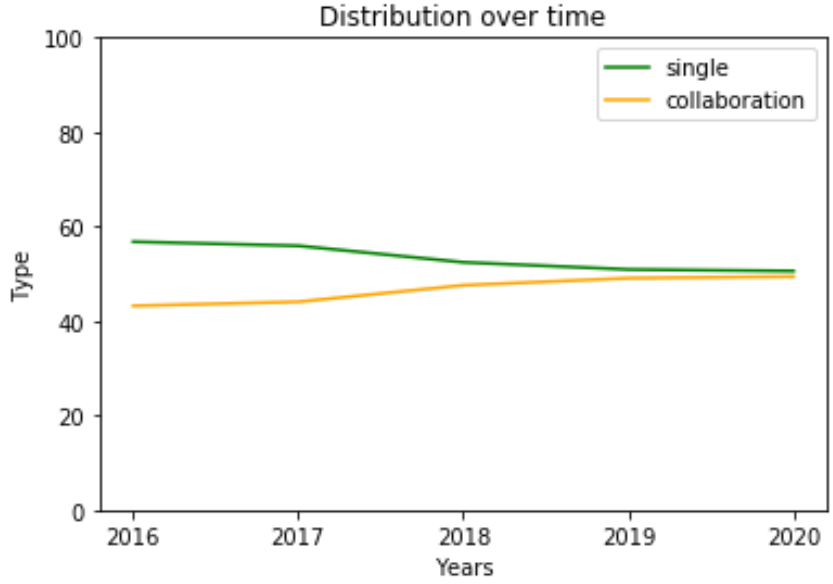


The proportion of women did not show a clear rising or falling trend in the five year period studied but remained between 27-33%.

In addition to total gender distribution, the gender distribution of papers written by individual authors as opposed to multiple authors was analysed. Here the proportion of women fell by another percentage point, to 28.5%. Again, no clear trend emerged over 2016-2020.



It was also found that 53.4% of the papers were written individually while the rest were written in collaboration. Over the course of five years, the number of papers written in collaboration rose slightly while sole-authored papers fell in number leading to both converging towards the middle.



Why Are Fewer Women Publishing At The Professional Level?

A lower rate of publishing cannot be considered a sign of outright discrimination (though that could be a significant reason) as many factors could explain the gap. However, women might be making choices that lead to less publishing due to underlying discriminatory reasons. To get the bigger picture we look at academic enrollment and employment in India in general.

Academic enrollment

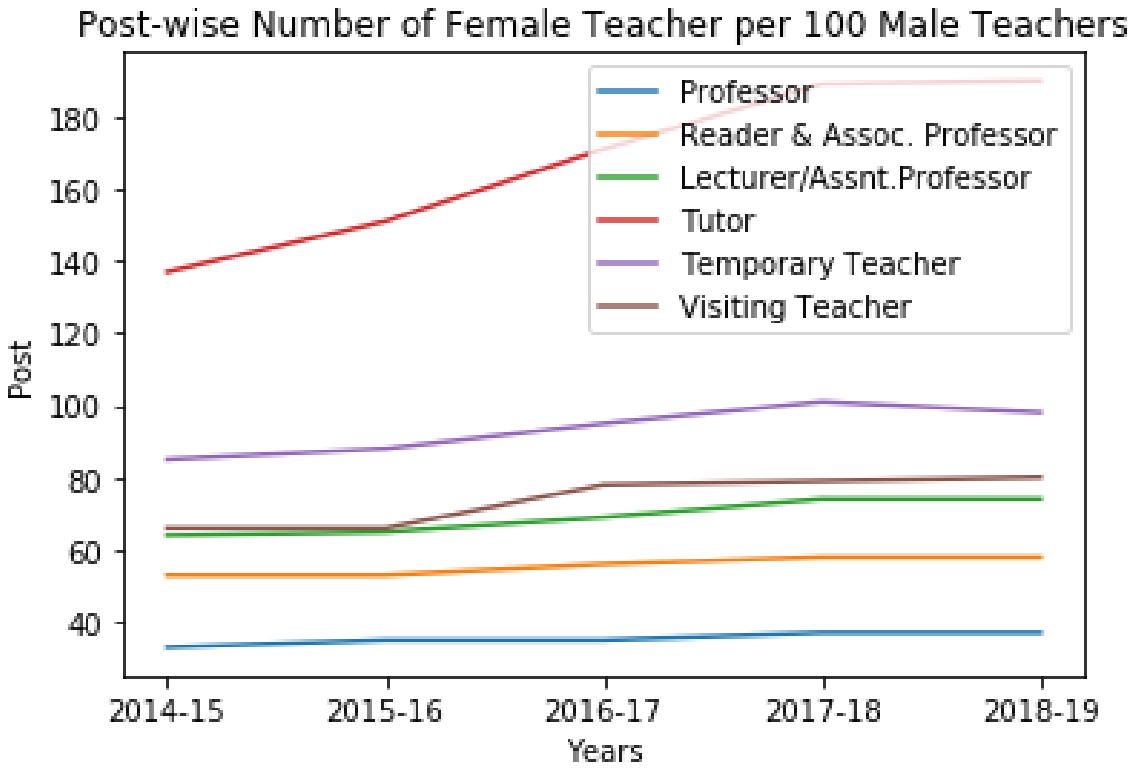
According to the 2018-19 AISHE report, the enrollment rate of women is slightly higher than that of men in undergraduate programmes while the opposite is true for M.Phil, Post graduate and PhD programmes. In humanities the ratio of men is higher than women except M.Phil., Post Graduate, and Certificate programmes. At the undergraduate level, the enrollment of women and men stands at 51% and 49% respectively. In particular, BA arts and MA arts both show a rising proportion of women outweighing men.

Females per 100 Male Students in Regular Mode of Education					
Programme	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
B.A.- Bachelor of Arts	118	118	121	124	126
MA. - Master of Arts	154	165	169	173	180

Higher enrollment could be the reason for women's share in the journal contributions at the undergraduate level to be slightly higher than that of men.

Academic Employment

Although enrollment is higher among women at the M.Phil and postgraduate level, gender wise employment data from the same report shows that fewer women are appointed as professors than men. In fact, the number of women falls more and more as we go along the academic ladder.



The number of male teachers has consistently been higher than the number of female teachers in all posts except that of a Tutor. What's interesting to observe here is that while females occupying different types of posts have risen over the years, the rise is substantially more for Tutor and Temporary Teachers than for more "coveted" or "important" posts like Professor or Associate Professor, where there's virtually no improvement. This could be because these posts employ more people than "coveted" posts or it could be a sign that women are resigned to positions of lesser prestige in academia.

Some contend that this occurs due to women making career choices that are easier to handle while also managing households. However, if this were true, more women should be present in academic positions over other jobs popular among degree-holders which involve more erratic schedules and sometimes more travelling etc. It also implies that women tend to refuse promotions for the sake of the household at the cost of a higher professional status and more money.

A possible reason for fewer promotions is that of women performing a disproportionate amount of care work and tasks that do not improve their promotability. One study of a research-intensive university faculty found that mothers of young children spend less time on research compared to men even though they spent the same amount of time for their jobs in total. Another study found that women were more likely to be asked to volunteer for and accept to volunteer for tasks that everyone prefers someone else to complete. Thus, it can be said that women tend to act as caregivers of the academic family.

Thus lower representation in journals could be a symptom of lower participation of women in research and academia in general. Studies have shown that women tend to underestimate their abilities and performance which in turn affects their choices and careers. This has been dubbed the confidence gap. At the same time, another study found that faculties were much more responsive to white males compared to other categories of students at the application stage. Women's lower rates of participation seem to occur both due to discrimination and their own perceptions that can be thought of as internalized sexism.

Conclusion

The presence of a significant gender gap in economics research is undeniable, as it is in many other fields and countries. Many theories have been proposed to understand this underrepresentation. It is likely that all the theorized causes work together and result in the lower participation of women in research whether it's- women avoiding careers that require long working hours due to the burden of care work; women performing tasks with low promotability; stereotypes about women's intellect leading to a 'confidence gap' between women and men which discourages their participation; or structural factors that discriminate against women. Thus, self-perception and discrimination (whether outright or unconcious) are both ends that need to be worked on to create a more equitable space for women in academia.

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An Unholy Union: Gold Digging and Emotional Labour in Relationships

By Haritha K. and Sakshi Dhawan

Abstract

This article explores the concept of emotion work or emotional labour in the personal sphere in general and within the context of heterosexual relationships and marriages in particular. It further examines the role of gender and attempts to draw comparisons between the emotional labour required for jobs and the emotional work required to sustain a heterosexual marriage or relationship. It inspects the narrative of a `gold digging' spouse during divorce settlements, and the harm that it inflicts on the non-propertied spouse.

Emotional Labour & Emotion Work: An Introduction

The term `emotional labour' is attributed to Arlie Russel Hochschild, a sociologist and professor emerita at the University of California, Berkeley, who formally coined the concept in her 1983 book `The Managed Heart'. At the time, Arlie described emotional labour as having to "induce or suppress feeling in order to sustain the outward countenance that produces the proper state of mind in others". She referred to it as the work of managing one's own emotions that was required by certain professions citing the examples of jobs like air hostess and waitress, where smiling and maintaining a pleasant countenance is part of their role. Nannies, eldercare workers, nurses, teachers, therapists, life coaches, call-center workers are other examples of jobs that require similar manipulation of our real feelings and emotions. The term has taken off since then, with it being a part of social media debates & discussions and everyday conversations. Hochschild and other sociologists have noted that emotional labor in this type of work often produces "emotional dissonance", i.e., a conflict between emotions experienced by the employee and those required by the organization.

Abraham, R. (1999) writes,

"Emotional dissonance was found to induce job tension leading, in turn, to emotional exhaustion. Employees with innately low self-esteem were more likely to experience emotional dissonance and suffer from emotional exhaustion. Other employees found that emotional dissonance reduced their self-esteem leaving them dissatisfied."

Hochschild's work on flight attendants found that unless managers acknowledged and appreciated the emotional efforts of their workers, the pressures around emotional dissonance created by so-called "surface acting" caused flight attendants stress, anxiety, and resentment against their employers — and, ultimately, long-term burnout. (Hochschild, 1983) Companies often take emotional labour for granted, going even as far as setting up a rating system for services provided by the employees where providing emotional labour gets you higher ratings, such as when Uber and Ola drivers have to take into consideration your musical preferences while driving or how your food delivery person has to mask his exasperation at hostile customer interactions. These companies not only advertise and take credit for the "professionalism" and "comfort" that their services provide but do not see this emotional labour worthy of being included in their wages. (L. Stark 2016) Academic studies and research models that acknowledge and evaluate the importance of emotional labour in the workplace are being taken more seriously by employers and corporations, even if monetary compensation for the same is not even close to being a reality.

Since then, emotional labour has also moved from being applied solely in the context of work to the private sphere of one's life and what it entails and demands of us, emotionally. It has also been defined academically as 'emotion work.' This extension in its meaning can be best encapsulated by the New York Time's definition of emotional labour being "the actions that tend to go unnoticed but still are expected." Being polite to a rude relative, setting up and managing children's schedules, intervening in arguments, remembering special dates in a relationship and planning birthday, anniversary or christmas parties even if it mentally strains you to do so are all examples of emotional labour in an interpersonal setting. There has been much debate over what can come under emotional labour, especially with reference to the argument of whether it is emotional labour or just labour you have emotions towards. Even Hochschild claimed the term in popular discourse has been very blurry and over-applied. In these cases, masking of your true feelings for the sake of those around you can be taken as the deciding factor.

The Question of Gender

This conversation brings an important aspect of this definition of emotional labour into the limelight: gender. Arlie Hochschild, in a recent interview said that in heterosexual partnerships, emotional labor often falls to women, who are generally socialized to take on the emotional lives of others. "Women often are conditioned to be nurturers and to put aside their own needs to tend to the needs of others," she added. Women themselves often discount the time and effort involved in caring work not only because it is expected to be a spontaneous expression of love but also because the illusion of effortlessness is part of doing the work well (Hochschild,1983).

Gender construction theory provides a theoretical basis for examining the extent to which gender is associated with the performance of family work. For example, the more feminine characteristics men and women apply to themselves, the more household labor they are expected to perform. Similarly, applying more feminine-expressive traits to oneself was associated with the performance of more emotion work among both men and women. (Erickson 2005)

Therefore gender as well as gender construction does play an important role when it comes to emotional labour.

Emotional Labour in Heterosexual Relationships

With almost half of the employed women in India working in the service industry, exploring the theme of emotional labour at work is of the essence. The idea of gender comes into play in the workplace too, a recent example being the outpouring of complaints online about how women find themselves having to repeat themselves multiple times in online meetings to be heard and their opinions taken seriously, an example of emotional labour. Women from racial and caste minorities have to manage `emotion work' in their personal and professional lives by either ignoring racist and casteist microaggressions and masking their anger or having to make an effort to educate and inform the people around them about why they feel uncomfortable even though the onus is not on them to do so. All of these take a toll on the mental well being of a person.

But another aspect of emotional labour or emotion work can be applied in the context of marriages. Marriages in India, tend to veer sharply towards women in terms of the physical and emotional labour required to manage a household and sustain a marriage. It is "expected" of women to do so and they have been conditioned to slip into the role naturally without questioning it.

While there has been a bare nod towards trying to recognize the economical value of unpaid labour women put in such as cooking, cleaning and so on, any emotional labour they put in tends to go unnoticed. Scholars argue that the reason why emotional labour falls so heavily on women in marriages is due to the fact that similar to house work, women are conditioned to believe from an early and impressionable age that being helpful, intuitive, empathetic, giving advice and easing tensions and disputes are "womanly attributes" and as a result of this, society deems them to be better at it. (Erickson, 2005)

In terms of sharing of household work, even when their partner picks a task to complete, women often have to take care of the emotion work aspect of it. Women primarily are in charge of primarily monitoring and assessing future needs even if men undertake these tasks in the end. Examples include keeping track of toilet paper supply, planning of dinner, selection of daycare centre, etc. Anticipating needs, identifying options for filling them, making decisions, and monitoring progress are mentally taxing and often a cause for conflict among couples; women do more cognitive labour overall and more of the anticipation and monitoring work in particular. (Daminger, 2019)

Feminist scholars have pointed out the obvious ties between patriarchal arguments against legalising paid & consensual prostitution and the emotion work women put in during sex in a relationship. In the former case, women who are willing to earn their living using their own bodies come under restrictions because sex is "expected" from women and not seen as something to be paid for. In the latter, research shows that women tend to "fake their orgasms" for the benefit of their partners.

A recent study (Brewer & Hendrie 2010) provided evidence to suggest that "copulatory vocalizations in women are not a reflexive consequence of orgasm." The data collected from 71 sexually active heterosexual women states,
"More detailed examination of responses during intercourse revealed that, while female orgasms were most commonly experienced during foreplay, copulatory vocalizations were reported to be made most often before and simultaneously with male ejaculation. These data together clearly demonstrate a dissociation of the timing of women experiencing orgasm and making copulatory vocalizations and indicate that there is at least an element of these responses that are under conscious control, providing women with an opportunity to manipulate male behavior to their advantage."

The study pronounces this conscious effort to make copulatory vocalisation in spite of a dissociation of timing as providing women with an opportunity to manipulate male behaviour to their advantage. But we can also look at this effort to induce feelings for the benefit of others as emotion work. Another survey stated that 91% of male college students experience orgasm during sex as opposed to only 39% of female college students and the subsequent study stated that in light of gender inequality and a social construction of

sexuality, endorsed by both men and women, that privileges men's sexual pleasure over women's, such that orgasm for women is pleasing, but ultimately incidental. (Wade LD et al., 2005)

Another major emotional manipulation that women are expected to do is to keep up a polite and pleasant countenance even under emotionally distressing behaviour by their partner, family or inlaws. Men, on the other hand, are not forced to do so in conventional family settings. In the category of childcare, women are the ones to be solely or primarily expected to be attentive to the children's emotional needs. (Daniels, 1987)

Gender roles in India still work in a binary, irrespective of economic status. Indian women top the global chart of doing the most of the unpaid work and domestic work. The 2020 India Inequality Report by Oxfam stated that urban and rural women spend 291 and 312 minutes respectively on unpaid care work, while men spend only 29 minutes and 32 minutes on the same. This lack of help and support when it comes to emotion work not only affects their mental well being but can affect women's performances in the professional spheres due to lack of time and energy.

Gold Gigging in the Context of Marriage

The term gold digger has been around for over a century, and is now perhaps immortalised in Kanye West's Gold Digger (ft. Jaime Foxx). While the term *'gold digger'* is almost exclusively used to refer to women, this was not always the case. First found in Rex Beach's 1911 novel, *The-Ne'er-Do-Well,* the term was initially used devoid of any gendered connotations:

"These people are money mad, aren't they? Worst bunch of gold-diggers I ever saw"

However, each subsequent use of the term in the 20th century inched it closer to being a gendered term. The Cambridge Dictionary defines a gold digger as "someone, *usually a woman*, who tries to attract a rich person, *usually a man*, in order to get presents or money". References to cold, beautiful and calculating women abound in popular literature and cinema, but the trope of a gold digger has evolved during the past century: from "spoiled, baby-ish party girls who end reformed as happy homemakers, wives and mothers" to icons and then to the villains they are today.

The gold digger shifted into the role of an icon under the shadow of the Great Depression, as a means of economic survival of women. As Slavens (2006), writes:

"...the Depression era gold digger, ..., served to emphasize the economic inequalities that were all too

apparent after the economic collapse of 1929. She also pushed to the forefront inequities between men and women in an economic situation that allowed only limited job access to women and encouraged women to stay at home and leave the few available jobs to men, the traditional bread winners for the middle class family. Unlike her predecessors, the gold digger of the Depression knew where she stood and the world-wise women who appeared in gold digger texts of the period have known hardship and are, therefore, socially and morally justified in their attempts to raise their status while exposing the flaws in a system that forces them to circumvent acceptable avenues to survive. In this situation, the gold digger became a powerful force not only for her exposure of class and gender inequities but also her challenges to conventional ideas about gender, class and a moral system built on both."

While much of women's socioeconomic mobility has always been closely tied to that of her husband, due to unequal opportunities in the job market (and during those times, in education too), women could not afford to marry men who could not provide them with financial stability. This dependence was further exacerbated during the Great Depression: In the United States, work-ban laws for married women were enacted in over half the states. Married women who worked were viewed as selfish women taking away limited jobs from those who needed them more (Perkins, 1930).

In the post-depression world, as women gained employment rights and opportunities and feminism progressed, the gold digger went back to being the villain: with no end goal in sight other than to trap a wealthy, old man with her beauty. As opposed to rebellion, gold diggers were now seen as regressive. However, the question remains: have class and gender inequities disappeared in the 21st century? The answer is a resounding no. Women's opportunities have not improved since the 1990s, and there remains a glass ceiling in most top sectors (International Labour Organisation, 2019).

On the other hand, despite the inception of sugar relationships - a transactional relationship in which sugar relationship is a form of transactional sexual relationship in which an older and wealthier partner (sugar daddy/mommy) provides material resources to a younger partner (sugar baby/boy) in return for her or his companionship (Nayar, 2016) - gold diggers continue to be viewed as unfairly taking advantage of men.

The narrative of a woman immorally extracting wealth from a man has most often been furthered under the institution of marriage. Women's dependence on their husbands for financial security becomes cyclic in nature: it is often used as a justification for lower wages and fewer job opportunities, and these circumstances themselves make it harder for women to support themselves and increase dependency. In the 21st century, too, structural inequalities prevent women from meaningful equality with men (Stewart, 2013). The term gold digger remains gendered in part due to its expansion: it is now an accusation levied on women who are seen reaping "undeserved financial gain" (Thompson). This is most obviously seen during a divorce. In an attempt to make divorces fair, the judiciary has been encouraged to take into account the

contributions of the non-moneyed spouse to the marriage and to child rearing. On the breakdown of a relationship, this often leads to a transfer of financial assets away from the propertied or moneyed spouse to the non-moneyed one i.e., it is usually a transfer from a man to the woman. This provides the non-moneyed spouse with a certain degree of financial independence on relationship breakdown, as their work at home led them to forgo property accumulation by participating in the workforce. According to Thompson (2016), accusations of gold digging on divorce were:

"…..undoubtedly influenced by the idea that individuals should work to support themselves on divocre, regardless of the cost to their earning power that mothering or homemaking has had. Closely linked to this is the importance placed on the ways in which spouses come to own property that results in spouses with a claim based on non-financial contribution to be treated as if, in Smart's words, 'they did not come by their share of the property in a legitimate way in the first place.' "

As an increasing number of women outearn their husbands, their non-financial contributions remain higher: the bulk of domestic responsibilities is still shouldered by women and they remain the primary caretakers for their children. Therefore, weighing financial contributions to a marriage more strongly than non-financial contributions during divorce settlements would unfairly penalise women.

Conclusion

Emotion work or emotional labour in the context of interpersonal relationships requires a significant amount of recognition and appreciation in lieu of the mental toll it takes on the person undergoing it. We have also established that emotion work largely falls to women, mainly due to gender construction and therefore needs to be taken into consideration during women empowerment planning or family and gender research studies.

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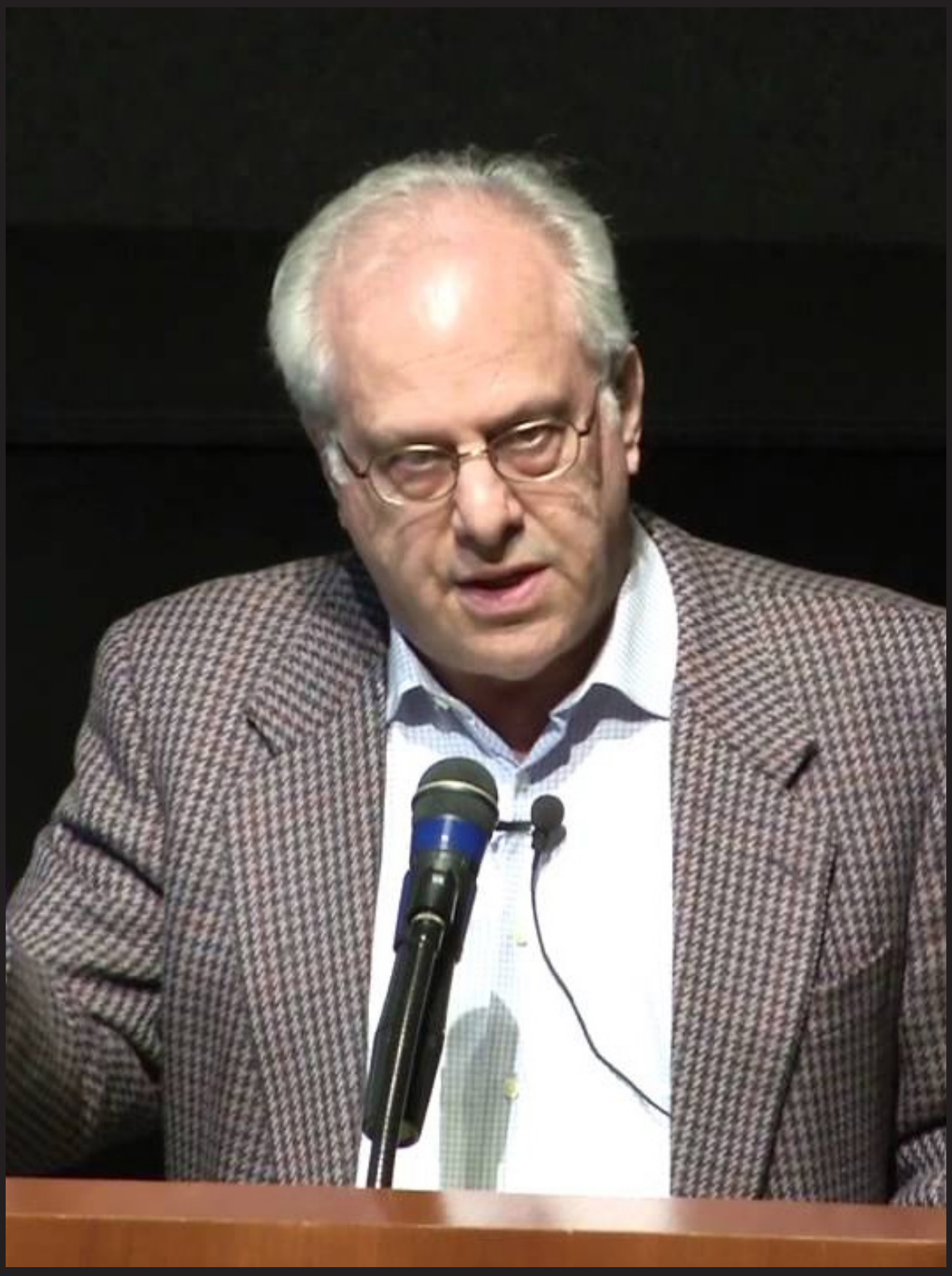
In conversation with: Dr. Richard Wolff



Editor: During the pandemic, across the world, governments have been announcing Keynes-inspired stimulus and relief packages intended to boost demand. However, this type of state intervention historically seems to end up with another crisis every few decades anyway. So, if it were to put on the textbook benevolent planner role, is there anything the state can do in a capitalist system to prevent an economic crisis?

Dr. Richard Wolff: The short answer is no, and the reason I say that is because of the 300 years of the history of capitalism. If you follow the general economic history, modern capitalism begins in England around the 17th century, more or less, spreads to Western Europe, North America, Japan and then through the colonial system pretty much everywhere else. So, we have modern capitalism as a global system. If you look at these 3 centuries, wherever capitalism has come to settle, it has demonstrated the same identical instability. It is either called a crisis, or a business cycle, or a boom-bust cycle, or a recession, or a depression. The words are endless in English and every other language because it is a recurring phenomenon. The best research I've ever seen is the case that it happens on average, an economic downturn, every 4 to 7 years. That's an average, so, sometimes it is shorter, sometimes it is longer. But you can see, the system has built into it a structural instability.

Here is another way to look at it. Capitalists have understood for 300 years that this instability is dangerous for their system. Because, when periodically you throw millions of people out of work, as we are doing today, if you show millions of businesses that they must now go bankrupt, that they must seize functioning, which is again happening today; then it does not take a genius to understand that in these periods of downturns, crash, or recession, some people, for example, people like me, are going to become critical of a system that has such built-in instability. The capitalist system understood that its own instability made it vulnerable to criticism, particularly from systemic critics, or in a short term socialists, communists, people who want to go to another system. So they had every incentive to do whatever they could to either soften these cycles, or better yet to get rid of them, to end them, to stop them. They have tried everything for 3 centuries. Very smart people, smart men and women, got together and tried to figure out how to get rid of this instability. In the depths of the greatest depression capitalism has so far experienced, the 1930s, you even had a new kind of economics developed by John Maynard Keynes that we teach as Keynesian economics, about how the government can use monetary and fiscal policy to try to do this. When I give speeches here in the United States, I explain that every president of the United States since Franklin Roosevelt in the 1930s, has promised the people of America, that if they follow his policies, not only will they get out of the recession that they are in—because every president has one—but each president promised that if they do what that he suggests and follow his economic policy, they will save their children from having to go through another economic crash. Every president promised, no president has ever fulfilled that promise. No president could do it, and that's why we are going through the one we have now.

In short, capitalism has tried to get rid of the business cycle, and it has failed over and over again to do so. Again, let me use the United States as an example. We have had 3 crises in this new century. We had what we call the dot-com crisis in the spring of the year 2000, we had the subprime mortgage crisis in the year 2008, and now we have the Covid-19 crisis in the year 2020. Three crises in 20 years, exactly on schedule for the 4 to 7 year average. So, if you don't want the instability, if you don't want to threaten your people with a system that crashes every 4 to 7 years, then your problem isn't the cycle. Your problem is the capitalist system which brings this cycle to you and has brought it everywhere for 300 years.

Editor: With the market of the vaccine continuously developing into a competitive sector, how do you think capitalism will affect its distribution? Additionally, in your opinion, how do you think the economies of developing countries like India will react if and when there is a delay to access?

Dr. Richard Wolff: Well, there is already a delay to access. It is a mistake, a serious mistake, to permit private capitalist enterprises to be in charge, in any sense, of the distribution of the vaccine. Let me explain, a capitalist enterprise is an enterprise organised with a particular prioritised objective and that is profit. To generate a profit, to maximize the difference between the revenues and the costs so that a profit can be achieved, which can be distributed to the owners, which can be used to expand the business. It can be used in whatever way the owners and the leaders of the enterprise, a very small minority of the people, think is the best way to utilise those profits. It makes no sense, it is a fundamentally irrational thing if you give the task of public health to an institution whose priority is something else. This would be the equivalent of saying to your police department that their job is to teach students in school. No, that is somebody else's priority, it is not your priority as a police person, or a fire protector, or any other function. The reason we separate functions and make them priorities is to get a better outcome. Therefore, the question is, what in the world would make you give the task of public health—preserving the health, maintaining the health and protecting the health—to an institution whose priority is somewhere else.

Let me drive it home to you with an example, again I apologise, I can give you examples easiest from the United States cause I am for better or worse, and these days it's worse, an American, so that's what I have to do. Here in the United States, we have a highly privatised medical system, one of the most privatised in the world compared even to most countries—your country, European countries, and so on. We, therefore, left it in the hands of the private sector to be prepared for the arrival of the coronavirus. We all knew that viruses are a part of nature. The last time we had a bad virus in the United States was in 1918, roughly a hundred years ago. It killed 700,000 people. We know very well what viruses can do, plus we are very aware of the SARS virus, the MERS virus, the Ebola virus. Everyone knows that viruses are a problem, and that if

viruses come we need to have tests, we need to have masks, we need to have hospital beds, we need to have ventilators, we need those things. Here in the United States, we have the manufacturing capability to produce all those things. But when the Covid virus hit the United States in March of 2020, last year, we didn't have adequate supplies of masks, or tests, or ventilators, or anything else. Why not? It wasn't privately profitable to do that. The companies that could have made tests, we had them. We had the raw materials, we had the labour, we had the technology. We had everything we needed to produce and to stockpile around the country supplies of tests, masks and everything else. But we didn't, and we didn't for a simple reason—it's not profitable, It's too risky for a private capitalist.

The explanation is simple. If I'm a capitalist and I produce masks or tests, I have to spend money. I have to buy the materials, I have to have the machinery, I have to pay the workers; and then what do I have—a lot of tests, masks and ventilators. Now I have to store them in a warehouse around the country, I have to secure them in the warehouse, I have to make sure that they stay clean, replace those that deteriorate, repair those that are broken, I have a lot of expenses. When will I be able to sell the masks and the tests? I don't know, the next virus may come in 6 months, it may come in 50 years. There is too much much risk, too much expense. So what the capitalists did, which is what they are supposed to do, they invested somewhere else. They made a different product, they made a different system, and they didn't make the masks and they didn't make the tests. So capitalists, and there's no nice way to say this unless you're an apologist for capitalism which you can probably tell I am not. So here's the nice way to say this, capitalism is a very bad way to organise public health. By the way, we have just gone over 350,000 deaths in the United States, over 350,000 dead Americans from this virus. So, this is a fatal failure of capitalism to make us unprepared. And you really can't fault the capitalists, because the capitalists who made these decisions were doing what they were told to do when they all got their Master of Business Administration certificate from their university.

Now, of course, the government could have stepped in. We all know how we fix the failures of capitalism—we bring the government in to do what the capitalists fail to do. The government could have come in, the government could have said to the capitalists, "Okay, you produce the mask. We, the government, using public money—taxpayer money—will buy the mask from you as fast as you produce it, and the ventilator, and the hospital bed, and the test equipment; and then at government public expense, we will store it in warehouses around the country, and we will clean it and we will keep it secure. All the risk is taken away, and we will pay you a price that makes you a big fat profit." Because that's the ransom that capitalism demands from the people, so long as people are willing to pay the ransom that capitalists charge us.

So the interesting question is, why doesn't the government do that? And an even more interesting question is, the government already does it somewhere else, why isn't it doing it in public health? To make sure you understand where the government already does it, because this is very like in India too, it turns out that the private capitalists have the same problem producing military equipment. If the private producer of the gun,

or the airplane, or the tank, or the missile, if that private producer had to make that and then store it in a warehouse and have to wait until the next war comes, it would be too risky and not profitable. No defence equipment would be produced. You should enjoy the irony that capitalism is as poor a choice for public health as it is for the military. But in the case of the military we solved it, didn't we? The government comes in, buys the missile as fast as it comes off the assembly line, buys the guns, buys the ships, buys the airplanes. Then at public expense stores it, maintains it, secures it, fixes it, updates it, at an enormous expense. Meanwhile, it pays the military producer capitalists a good price, a very profitable price, and takes away all risk. So the governments do what I am describing for the military, but they don't do it for public health. If we had more time I would stop now and I would play you the national anthem of the United States, just so you could appreciate the charming quality that capitalism brings wherever it pollutes the environment.

Well, you might be interested to know why the government didn't for public health what it does for the military. The answer is that the private health system of the United States is a monopoly of four industries that work together—doctors, hospitals, drug and device makers, and medical insurance companies. They have control of the private health sector. Every effort to produce a public health program that would give universal support to people, the way you have in every European country and in many countries beyond Europe as well, they have been fighting that successfully for a century. They don't want the government anywhere near the medical profession, because of the risk that the American people will begin to demand a public health system, and then their private monopoly will be gone. That's their problem, that's why we have a disaster on our hands. Capitalism is a very poor way to organise a health system, and it is equally horrible as a way of handling the vaccine system.

In order to make vaccines profitable, they are going to be distributed to those who can pay the most. Don't be fooled, there'll be lots of words and lots of politicians mumbling junk. Don't waste your time, this is a capitalist system. The vaccine is being distributed here in the United States in a very controlled way. If you follow the value of shares trading hands on the New York Stock Exchange, you will see the remarkable increase in the value of shares of pharmaceutical companies; because everybody knows they are making a killing, and boy do I mean that literally, by the way that they are handling vaccines. So the poorest are going to get it last, if they get it at all. And when there are a few exceptions, as there always are, for example, exceptions of people who work in hospitals or people who work in other kinds of dangerous areas, there will be very big television stories about the wonderful nurse who got a vaccine, or the wonderful orderly in the hospital. It's all window dressing, don't be fooled. The basic vaccines at this point are available if you have the money. I live in New York City, I am speaking to you from Downtown New York City. I am a professor, my wife is a psychotherapist, we have a very nice and comfortable income, we are in the upper 20% of income in this country. I called my doctor who is on Park Avenue. If you ever come to New York, Park Avenue is a very elegant avenue in New York City. My doctor is on Park Avenue, I called him last week. I said to him, "When can I get the vaccine," and he said to me, "Well I would guess maybe in March or April, call me back then." I said

to him, "What do I have to do to get it sooner?" He said, "I can give you the name of another doctor that you can call, but it will cost you a pretty penny." That was his phrase, "a pretty penny." I don't know what that means, but I think you get the idea.

Editor: A couple of months back you had an interview with a YouTuber named Mexie, and you were being optimistic in saying how you think capitalism in the US, UK, and Japan has almost reached its end or its tipping point. However, developing countries like India, Brazil and China have not reached the tipping point yet because they were "late to the party." Can you explain more about that, and is the general strike that is going on in India right now in a direction towards that tipping point or do we still have a long way to go?

Dr. Richard Wolff: Well you know, I am not good at making predictions. I always thought that if you want to make a prediction, you should go to the county fair and give that person a few dollars. He or she will tell you who you are going to be sleeping with next week, and you will giggle and laugh because you understand it's entertainment. If you actually got nervous because you don't want to sleep with that person next week, then you've misunderstood what the point of all of this is. It's entertainment, it's not serious. Nobody is able to tell you what is going to happen next week or next month. What I was trying to suggest, and I say this because you don't know me personally, but I am not an alarmist, I haven't been saying for a long time that capitalism in the United States is declining. This is something I have come to slowly and recently. The accumulation of evidence here in the United States, which is arguably the most powerful centre for capitalism, the evidence here of disintegration is overwhelming. I assume you have seen the pictures from earlier this week of the disintegration in our nation's Capitol, and you'll be hearing more about that. It is falling apart. We have a president who is somewhere between an idiot and a clown, and he is being replaced by someone who is already three-quarters dead. I mean, we have a serious difficulty, we are producing leaders that are bad jokes. They don't have any policy to solve anything, and they are not solving anything. Inequality in this country is at a level that we make comparisons with ancient Egypt and the Pharaoh. Jeffrey Bezos, the guy who owns Amazon, has a personal fortune of $200 billion. He has become $60 billion richer over the last 10 months, while 60 million Americans had to file for unemployment compensation because they have no job. This is not a system that is working well, this is a system that is falling apart. Trump is a symptom, the assault on the Capitol is a symptom, the fact that I have a huge audience for what I do around the United States, that is also a symptom. It is a system that is falling apart.

One of the major reasons is the profit motive driving American corporations, and indeed corporations from other parts of the world, Europe, Japan and so on. They are leaving the United States, they've been leaving it for 30 years. They are moving production out of the United States, because wages are too high, or to say the same thing, wages are much lower in places like, my apologies, India, Bangladesh, Malaysia, or Indonesia. You

know better than I do about what is going on. And that hasn't stopped. There's a lot of publicity, "Oh we're going to bring manufacturing back." No, we're not. Obama promised to do that, he failed. Trump promised to do that, he failed. Biden will promise to do it, and I guarantee you, he will fail.

The Chinese economy is now the ascending global capitalist power. The United States is declining, India is somewhere in between, Brazil is somewhere in between. I don't know how this will work, but I do know that every American corporation that I speak to, and I should explain to you that's partly because I am a product of the elite universities of the United States. Even though I'm a poor parent, and my parents were poor—they were immigrants, my father was French, my mother was German, English is my third language, etc.—but I was born in the United States, I'm an American, I went to Harvard and Yale, and all of that. As a result, I know all these things personally. They are done with the United States. If they are the heads of a corporation, as many of them are, they want to go where the wages are lower and the market is bigger. And there is a place on Earth where the wages are lower and the market is much bigger, and it's called the People's Republic of China. That's what capitalists respond to, because they have to. That's a competitive objective they have, their competitors are already doing it, if they don't do it too they are finished. When it comes to the end of my company and my reputation as an executive versus my patriotism, that's an easy choice—patriotism out the window. This isn't going to stop. It's not a question now of whether the United States declines, it is really only a question of what the steps are, what the pace is, what form it will take.

But now to answer your question, what is going to happen to a place like India, is very similar to what is going to happen to a place like Brazil. But here's the problem—with all due respect, please don't misunderstand me, I'm not evaluating—you're not in the situation of China. You don't have the world market that the Chinese have built over the last 40 years. There are many reasons for that, but that is the reality. You are going through rapid growth. Capitalism when it has had rapid growth has often overshot the mark. That happened in Europe, that happened in the United States. We have had general strikes here, we have had a very rough and bitter struggle between capital and labour throughout the history of American and European capitalism. You're having that in India, I'm not surprised. That's what happens when you have capitalist developments. You can soften the blow if you are very successful. The history of the United States is precisely that.

The United States was able to get huge profits after the Civil War that century, from roughly 1870 to 1970. Because the United States was in a very special position then, a little bit like the Chinese now, they got enough profits that for the entire period they could raise wages too. They never raised the wages as much as the profits, inequality was very bad, but they were able to. And this is a very important fact, from 1870 to 1970, every decade the real wages of American workers went up. It gave Americans the idea that they live in a charmed place. It gave rise to notions like the American dream or American exceptionalism. It gave the

idea that every generation will live at a higher standard of living than their parents, because for a century it was true. In 1970 it stopped, and the United States has been in a cultural and political crisis ever since. It had no way to anticipate this, it had no way to think about it, its leadership denied it. It survived only because, since 1970, when wages have not gone up, the real wage in the United States is the same now as it was 40 years ago. How has the standard of living risen? The answer, debts. Americans are pioneers in the amount of debt per person. Debt to buy your home, debt to buy your car, debt with your credit card to buy everything; and in the last 20 years, the new one, debt to send your child to college. The level of debt of the American working class is, literally, killing them.

You have a very fragile system, and in India you are facing a capitalism growing quickly, but not rich enough, not in the position that the United States was or the Chinese are. You may get to that, I don't know, I don't think anyone knows. And if you do get to it, your capitalists may be smart enough to keep the system going by sharing some of the profit in the form of real wage. The Chinese have done that, real wages have risen in China over the last 30 years. If you have never looked at those numbers, look at them, they are very impressive. It explains why the Chinese Government is in a much more secure position with its people than the American Government has been, and will be for their foreseeable future. So I think the question is, you're going to have capital and labour struggles. But because your capitalism is always in the shadow of the declining but still strong capitalism of the West, and the rising power of the capitalism to your East, that's going to create a very special set of problems for Indian capitalism.

Editor: In your 2011 paper 'Teaching economics differently by comparing contesting theories' you talk about the lessons learnt from teaching economics over the years, and you pointed out that textbooks and courses lack in offering alternative theories. In the decade that has passed, have there been changes in the pluralism of economic theories in the curriculum, and/or do they encourage them against each other?

Dr. Richard Wolff: I wish I could give you better news than I have to give you in answer to this perfectly good question. Economics is a backward discipline, and it has been all my life. As I said, I went to Harvard as an undergraduate, then I went to Stanford in California where I got a Master's Degree, and then I finished my education at Yale. By American standards, I am a product of the elite of the elite universities in this country, and my PhD is in economics. If you count the full time from my beginning at Harvard till my PhD at Yale, I spent 10 years of my life in the Ivy League schools of the United States studying economics. Our universities have a two-semester system, so if you're in there for 10 years it's 20 semesters, and I took no breaks so I did my 20 semesters in a row. Only in one of the 20 semesters was I introduced to works that were in any sense critical of capitalism, that was at Stanford. I had a teacher - if you get a chance, do read his work, he is long dead but his name is Paul Baran. By the way one of his specialties was the economics of economic

development. You might find it interesting. I certainly did. He was a wonderful teacher. In one semester I had that. The other 19 semesters were as follows: they had two purposes. Number (1) to teach me how to explain and express what was going on in economics in such a way that the vast majority of the people I would be talking to had no idea of what I was saying. In other words, I learnt to be mathematical, technical and abstract in a way that made economics a mystery and turned most people away from pursuing it because it was either archaic or technical. Number (2) I discovered that they weren't interested in teaching how the economy works. What they were teaching me was how to be a cheerleader for capitalism. How to think about capitalism in a way - and I am assuming you know some of this language - that capitalism was a system that went to a stable, unique equilibrium that was pareto optimal - if you know what that crazy language is. Look at the words "equilibrium" there is no such thing. "Unique" there is no such word either. "Optimal" that's an arrogance that you shouldn't take seriously. But it's very important to know that the words are designed to get you to understand, you are a celebrant. It's like being introduced to some religious institution as the minister or the priest or whatever.

It's so grotesque in the US that long ago the businesses said to the universities that look, we are very happy that you are making people think that capitalism is the greatest thing ever invented by the human mind but you are not helping us by not having young people come to us understanding how a business works which is what we need. So, the solution in the US was to create a second economics department parallel to the first one. The first one which I am a product of is the celebrator - the one who says here is the ways capitalism is fantastic - if you know the famous Robert Browning poem: "capitalism is fantastic and let me count the way" and your education is counting the ways. This other parallel economics department is called a business school. What do you do in a business school? Well, you study business. And what do you think business is? It's economics, you idiot. Why do you think we have 2 departments in economics? We don't have 2 departments of history or English or biology. One, you go to study how the economy works. But how does a business actually work? What is accounting, marketing? What is investment theory and policy? I have taught in business schools. But that was not where my primary activity was. It was in the economics department; you are there as a high priest. Your job is to tell people to love capitalism and to believe it's the best and everything else is inferior, less efficient. All kinds of - and pardon me now, I assume you want my honesty - it is junk. This is what marx called vulgar economics.

Let me give you an example. We are required to teach you the concept of efficiency. The concept of efficiency is a ridiculous enterprise. Let me explain. Every act in economics that happens generates a whole long series of consequences- some of them happen immediately, some happen next year, some happen 10 years down the road. How do you know that whatever decision you made was efficient? Answer: you look at the consequences. And you measure the consequences that were positive and the consequences that were negative. And if the ones that were the positive were greater in sum than those that were negative, you say

it was an efficient act. Okay. Sometimes this is called cost-benefit analysis. This is charming. Just no human being can do that. No human being ever has done that. That's like you telling me you have spent a number of years studying how to leap over tall buildings. I am here to tell you you can practice till you are blue in your face, you cannot jump over a tall building. And you cannot measure costs and benefits as it's equally unavailable. Why? Two reasons. One: many of the consequences of an act happen in the future and you don't know the future. So, don't tell me you can measure the cost and benefits from the consequences. That's childish. Two: any consequence you point to or an act that you are studying is never the consequences of only the act you are studying. For e.g., if interest rates go up and 6 months later the exports go up- you cannot infer that the exports went up because the interest rates went up. You learnt correlation is not causation. Well, the logic is that the rise in exports has 50 other causes alongside whatever you are studying. Measuring costs and benefits is something no one can ever do. It's make-believe. To use a technical term, its bullshit. That's a very important word in American English. Bullshit is a wonderful word because it covers this sort of thing. And yet I was required to sit through several semesters of instruction by a very smart set of teachers who taught me how to conduct cost benefit analysis. And if I were a greedier person than I am today, I could make more money today doing cost benefit analysis for the people who will pay me than to be a professor but this is exactly the same as standing as a truth than going out in the middle of the woods, taking off all your clothes looking up at the sky and saying the following 10 words very quickly and that will change your life. If you believe what I just said then you should study cost benefit analysis.

Capitalism isn't efficient. Not because it is inefficient but because it is a make-believe concept. It has no content logically or analytically. It is a religious way of suggesting that something about capitalism is superior and that is the job of economics. And it was very hard to do. And so, they invented the make-believe of efficiency in order to substantiate the idea of capitalism is someway efficient.

Let me close with this example. When I was younger, I was tempted because I am married, I had two children and you know you don't make enough money as a professor in this country to really take care of your kids particularly because college education for both of my kids was very expensive. So, I would occasionally do a cost benefit analysis for some company. And I remember the first time I did it- large corporation and I won't mention the name because you know it. The first time I went in, the VP who hired me and two other economists and an accountant and a lawyer to make a report - we had to find out whether it was efficient to invest in such and such a business. And we met with him and in the course of the hour that we met to discuss the project, it became very clear to us what he wanted the report to say. He is a businessman. He is not interested in objective science. He found the idea funny. We were naïve academics; we took that crap seriously. So, he explained to us the study he actually wanted us to do and the conclusion he actually wanted us to reach. After the thing was over and we wanted to know him a little bit; it was an occasion when we all were in a hotel and we went to the bar and had drinks and we probably had a bit too many. And so, I asked

him, you know, it was very strange for you to tell us that we were to do an examination and find out this result. So he looked at me and said, let me explain. He was much older than us. I will explain to you, young man, what's going on here. I am an executive. I have to make a decision. Will our company invest a billion dollars to set up a branch factory in Hyderabad for example or not? I have to make that decision and I am very worried. If I say yes and it doesn't work, I am not going to get promoted in this business. I am going to be blamed for having made a bad decision. And likewise, if I say don't invest and if our competitor does the same and does well with it, I will be in trouble. So, I have to make a decision, which I have already made but I need a report so that if the investment doesn't work out very well and they call me in and tell me why didn't it work, I should be able to say that it's not just me, I had these Harvard and yale specialists and they wrote a report and that way the chances that he will be fired will be lower. In other ways he was saying to us Harvard yale fellows we are window dressing and this whole exercise was bullshit. He needs it to cover his rear end in case things don't go well for him. Research- don't be silly. Truth- who cares. And you shouldn't have any illusion but I warn you that your teachers live in that illusion.

Economics in the US is as lopsided today as it was when I went to school despite the crisis against capitalism that I am talking about, despite the movements against capitalism that are stronger today than at any time in my life in the US. It is now possible to talk openly about socialism. For most of my life that was impossible. If you start talking about socialism, people stop listening to you- they are scared, they don't want to go there. In economics it's still like that. In the US today, the overwhelming majority of departments of economics in colleges teach neo-classical theory exclusively and nothing else. In many of these departments you cannot get a job if you are a Keynesian economist. In those places where you can. They fight with each other- the neo-classicals and the Keynesians. And one of the very few things the neoclassical and the Keynesians can agree on is the need to exclude the Marxists- and those are even rare. You would never have heard of me if I didn't go to Yale and Harvard. I am able to function in the US despite my being interested in Marx, not because of it and the reason I have an audience is much more that americans are intimidated by the prestige of the Ivy League. They don't know what to do with me- I am one of them and then something went wrong. Maybe when I was a very small child, my mother dropped me on the floor and something went wrong with my head.

To give you an example -in my class at Yale- my classmates were overwhelmingly male but there were 2 women out of about 40 men. One of the 2 women was named Janet Yellen. She is about to become the Secretary of Treasury and she used to be the head of the Federal Reserve. During my time as a graduate student at Yale, we formed a left-wing economic association. We were so disgusted by the American Economic Association (AEA) that we formed something known as the Union of Radical, Political Economists (URPE), it still exists and produces its journals. I participated in helping to form it as did a whole group of economists. Janet Yellen was in no way involved. She kept away from our effort as if we were a bunch of lepers and getting anywhere near us, she would risk getting infected. She has never done anything remotely

critical of capitalism in her life. She is married to another economist who has the same politics. These are exactly what Joseph Biden would choose because they are like Joseph Biden except they are not male. She is a product of this kind of education. She cannot think of an alternative to capitalism because no one ever entered her life in any way as a teacher, as a fellow colleague, as a professor who was systematically able to say that look- I think there is another way of organizing the economy, it looks like this. What about this? Maybe the problems of capitalism can't be solved within capitalism and need a change. You know like the problems of slavery can't be solved by having a nicer master. You have to get rid of slavery. Or you can't solve the problems of feudalism by urging the lord to be nicer to his serves. You are not going to solve the problems of capitalism by asking the employers to pay the workers better. That's not the way it works. You solve the problems of the system by at least being open to the idea that maybe the system needs to be changed.

Nobody that Mr. Biden has with him - and I know at least half of the individuals in his economic team - has a clue. And they are very smart people but they have no exposure to this. They never had it as students or colleagues and not in their minds. They have not read the material or debated about it. They come in innocence. They are going to make capitalism better. That's who they are. And they were trying to do that for Obama. Half of the people that Biden has chosen are academics that Biden has chosen are from the same environment that I live in. I know what they know and they know and they don't have any clue other than to make capitalism better. The other half of the people are held on from the Obama administration. Obama put Yellen as the head of the Federal Reserve. It's the same people. They were making capitalism better too and the success they had is what enabled Donald Trump to become the president. So if you expect something different from Mr. Biden it requires that you have no idea of what's reality here. The only hope for economics is the new generation of young people that's coming to the profession now. Those people have been shaped by the crisis of 2008 and the crisis we are in now. They are dissatisfied with the absurdities of neo-classical and Keynesian economics. And they are fighting lonely battles that you will never hear about in the classrooms or anywhere in this country with the help from a few older people like me and that's going to change the profession but that's going to take time.

Editor: For a lot of young people, communism has come on to take a meaning of equality of opportunity rather than any theories of Marx or Lenin. Do you, as a Marxist economist, see this as reflecting the essence of these theories or as a view that ignores the intricacies of these theories?

Dr. Richard Wolff: Well, you know, good question. Complicated kind of answer. Marxism as you know, if you go back to the basic literature of Marx, at that point socialism was a critique of capitalism. I assume you all know that Marx never wrote about communism ever. He didn't write much about socialism. And what he did write was really a critique of capitalism as capital itself the book is. It was only with the Paris commune- one little moment in Marx's life- that people like him, socialists, were able to take power in society. And in this case the society of a city- the city of Paris in France. And it only lasted for a few months. By the way, a very very important event- the 1870 Paris commune- if you have never read about it- read about it. Marx was absolutely fascinated. He and his people were active in the Paris commune. It was the only moment in his life where you might have had a chance to- I would use the word loosely- apply his thinking to the question of reorganizing the society. Marx devoted huge amounts of time and energy to analyze what had happened. What the communards in Paris had achieved and what terrible mistakes they had made. And if you read the pamphlets he wrote on civil wars in France, you will see that he was as interested in what they achieved to build on as he was in understanding the terrible mistakes, he saw them having made and should not be repeated.

One of the people who studied Marx's writings on the Paris commune the most was Lenin. And Lenin's pamphlets about the conditions in Russia refer to which of the lessons Marx got from the Paris commune applied to the new situation in Russia when the revolution enabled them to become the second experiment in how to apply Marxian theories. So, I looked at the Soviet Union from the 1917 revolution to 1989 collapse as a major experiment in applying Marxist thinking. And that experiment showed very great achievements we should build on but it also like the Paris commune, showed terrible mistakes that we need to learn not to repeat. If things would have happened in a rational way, that's what would have happened and we would have a rich literature that you and I could use of Marxists looking at the pros and the cons in order to learn better lessons for what we could then do in places like Vietnam, Cuba, China or North Korea etc. However, the Cold War intervened. Under the conditions of the cold war, the failures and mistakes of Soviet Union became the dominant narrative in the US. And the success and achievements denied.

Let me give you an example. If you look at the growth of the GDP- this number that economists take so seriously- a rough measure of the total quantity of the goods and services produced each year in the economy. If you take a look at the GDP as a reasonable index of whether the economy is growing or not then the fastest growth of GDP in the 20th century was achieved by the Soviet Union. And the fastest growth of GDP in the 21st century was achieved by the People's Republic of China. All UN documents show that- I am

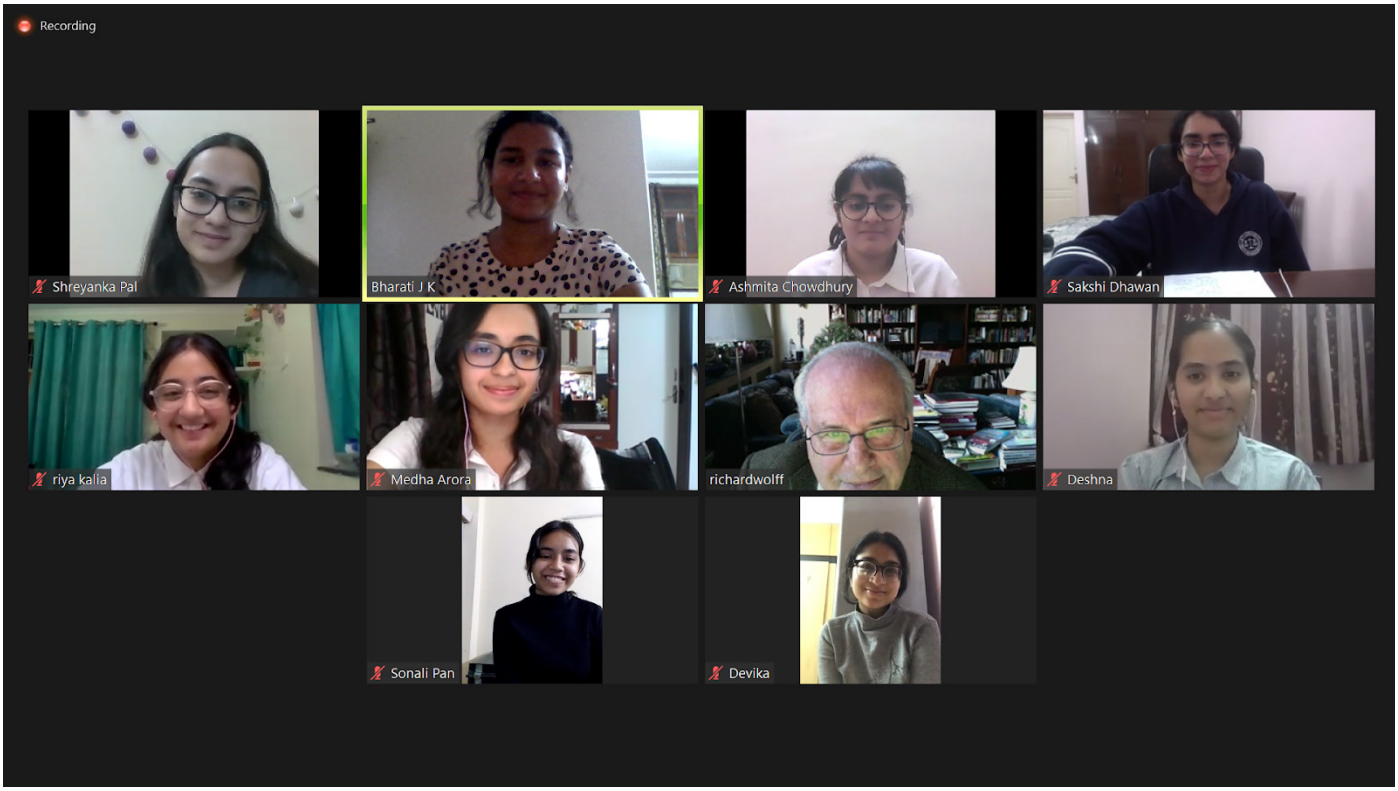
not making something up. But when I say to my American audiences what I just said, it takes me an hour to persuade them because their brains can't do that. And it's not their fault- I am not criticizing them. This is the way they were brought up. This is the way this country functions. Look I mentioned to you before, there are a handful of Marxists teaching in the US. Where are you going to learn any of this? The rest of the people are not neutral. They are people who grew up in the Cold War. They either know nothing about the Soviet Union and China or they live in a world of hostility and denunciation and they are not interested. So, I have to put in a lot of work.

Let me give you another example that is not so stark. My family is French. My mother was born in Berlin. I speak German and French. So, I follow events in France and Germany. I explain to my students that in France and Germany- I generally take France because Americans somehow feel closer to France than Germany. I say that in France, the law requires that as soon as you graduate high school and get a job, the employer must give you, by law, five weeks of paid vacation. Here in the US, you don't get 5 weeks of paid vacation after 20 years of service. There is no law in this country mandating paid vacation. I need an hour to persuade these students that I didn't just make this up. I have to bring in UN documents. And then when they finally get it, you should see their faces. They are so sad because now they have to ask themselves an awful question- why didn't I know this? Why did my parents never tell me this? Then I tell them that in France you have medical insurance from the day you are born till the day you die. And if you get sick then you go to the doctor and no one asks you to pay for anything. Then I tell them in Germany today, if you want to go to a university, it is free, there are no fees. 7 countries in Europe have this. Not only is it free for a German, it's free for anyone. There are 20,000 Americans that have gone to Germany to get their college degree because they couldn't afford it in the United States. My students look at me because now they are deeply in debt. I explain to them that Germans do not have debt for going to college. You do but they don't. This is too difficult. It's a kind of struggle.

So here is the problem. The association Americans have and I am assuming is in many other parts of the world. The association is Marx, Russia, China, Stalin, evil, bad, don't go there. I can say it all in fancy academic language but you understand what I am saying. And nobody has shown then that there is another part of the tradition that you might be interested in is the critical analysis of capitalism. By far the most developed tradition of criticism of capitalism that exists in the world is Marxism. Is everything that Marxism says is right? Of course not. Are there people who are Marxists and do crappy work? Of course there are. But if you want a developed tradition which has a number of really profound insights whether they are from Marx or Engels or Lenin or Trotsky or a long list of others including some from India. That famous family that I grew up reading- Dutt- I don't remember whether they are still, but he was Indian scholar who was a Marxist and did wonderful work. My point is that it is our job- my job, our job I hope- to read Marxian literature and to get from it the critique.

Here is how I make the argument here in the US. I say to the students, suppose you're given an assignment by a professor to do an analysis of a family that lived up the street from you. All you knew is that they are a mother and a father and two children and you knew little else. One of the two children thought that the family was a wonderful family, and was deeply grateful that he/she had been born into the family and had gained so much. But the other child thought of the same family as a psychological basket case and that it was crazy and the best thing they could do would be to get him far away from the family as soon as possible for his/her mental health. Now you have to write a paper about this family. Would you talk about only one of the two children? I am sure most of you would be smart enough to know that would be a very weird way to write the paper. You would have to talk to both of them then you draw your own conclusion- having listened and asked questions. If you want to understand capitalism by all its means, read the people who love it but also read the people who don't and then draw your own conclusions. In the US, never in my lifetime, and you can tell from my white hair, have I been around a long time, nothing like that has ever been done in any school of education- not in elementary school, not in high school, not in university. I have taught in half a dozen American universities, nothing like that has ever been dared to be done in my lifetime. There is no way. How did I learn Marxism? By myself. I went with other interested students. We got the books, we got the pamphlets and discussed it amongst ourselves. We made up our own education because we understood the horribly unbalanced and lopsided education that we got.

And let me assure you. Before being an economist, I was a mathematician. I am not intimidated by arithmetic. I can assure you that the Marxist tradition is a very well worked out and very sophisticated body of science. Is everything that it says right? No. Does it have empty spaces, missing arguments? Yes, it does. All traditions do. So does the Neoclassical, so does the Keynesian. But the Marxian is fundamentally different because its approach is critical. It doesn't think capitalism is the end of human development. It thinks that you can do better than capitalism. It used to be difficult in the US for me to say that we can do better than capitalism. I am happy to tell you that when I say that now in the US, students get irritated and tell me of course we can, we already know that. We want you to help us figure out where we go from here, what needs to be done. But to defend capitalism, I watch my colleagues of a lifetime struggling more and more to try to come up with defenses. And if you want me to be honest with you, I enjoy their difficulty.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In conversation with: Ronak Jain

Editor: We'll start off with something that we all want to know about- your research journey from an undergraduate student at Cambridge to a PhD candidate at Harvard. Can you tell us a little bit about that? We'd really like to know.

Ronak Jain: Sure, if I reflect on it, I could spend hours on this question. It's been fascinating, with its own ups and downs. I'll stick to the research part of the journey. In Cambridge, the first two years are meant to be pure coursework. At the end of first year I was particularly excited to get into development economics, it's what I always knew I wanted to go into, even before I started undergrad. So during the summer vacation of first year, I came to Delhi and did an internship at Center for Civil Society. That's where I got my first field experience; where I went around a couple of 11 schools or so, interviewed teachers about incentives and tried to find out about what kind of incentive structure is in schools and so on and so forth. So that internship experience was my first kick-off into research. Then in my second year I took up an RAship. Second year is meant to be where you apply for banks for an internship, and there was a whole rush to it. And I really, really tried to get myself into that zone but I just couldn't. And even if I submitted an application it would come unsuccessful so I knew that that was not my field and I really didn't have a passion for banking. So I kind of just stuck around, RA-ship wasn't a plan. So at the end of second year I didn't have any internship. I went to one of my development economics professors, and asked her if there was something I could help her with in terms of research. And she had some work that she was doing and she asked me to come on aboard and during the summer I helped her with it. That involved a bit of data work- going to the library, looking at previous archives, like history and development, so really looking at all Indian census, dating back to like 1800s and 1900s. So that was a really different experience and she was very encouraging. I guess every step I've had someone who's really encouraged me, pushed me in my research journey. Then came the third year, which is when actually the first proper rigorous research experience kicks off because as part of our undergrad we had to do a dissertation and I enrolled for doing a dissertation on econometrics which wasn't at all my forte. When I went in, econometrics was the subject that I hated the most. I just couldn't get probability theory in my head. But she has become my mentor since then and I really admired her and wanted to work with her. It was one of my most pleasant experiences, the dissertation, the third year, it focused a lot on the econometrics of human capital production estimation, which is not technical, just about skills and how skills grow over time and I was looking at some data from the UK, for children. But that kind of really launched me into [the realization that] yes, this is something I enjoy, I really enjoyed all the conversations I had with her. So that experience more than anything kicked it off. This is the person I look up to, she's always been like a constant mentor in my academic career. In third year we applied for masters, I got into Oxford. There the second year was meant to be a pure thesis, a thesis which could go upto like 15,000 to 50,000 words. So that could be like a proper dive-in to research. And there what I did was, I used my experience which I got in the first year of undergrad, which was on teacher incentives. I had done just qualitative work mostly, coming to Delhi and working at CCS, but that experience got me thinking that this is

the topic which could really use some theory, which didn't have any theory at the moment. At Oxford what I did was I took that topic which I had- teacher incentives and approached it from a theoretical perspective, so I tried a different technique, and there I was lucky to have a really good theory supervisor. So I had 2 supervisors there, again, who really really pushed me and encouraged me. So that was the journey up until Oxford, and that thesis helped me get into Harvard because as part of the admissions process you have to submit something that you've written extensively on and that's original. So that became kind of my natural lead on. When I was applying for the States, it showed off that this is something that I wanted to do, these are the techniques that I've been using, my undergrad gave me a foot ahead in terms of econometrics, my masters gave me a foot ahead in terms of theory and so on and so forth, And in my personal statement, I kind of made the point that I wanted to combine these principles, and go for development economics. And then at Harvard, still in the process, it's not finished but the first 3 years have mainly heavily focused on coursework. But it's been developing ideas and research, in terms of field work, everything is grounded but it's been like a process of thinking and brainstorming about ideas so far. So that's a long-winded story about how every step has led into something else but I guess overall I think what has helped me most is I've sticked(?) on and done whatever at the time, which really inspired me. So whether it was a person, whether it was a professor, whether it was a topic or a subject, like metrics then theory and switching between both. So really doing at that moment, whatever you're enjoying or whoever you're looking upto, I think is a great way to push forward.

Editor: As young undergraduates, many of us are looking forward to perhaps pursuing PhDs or entering the research track as economists. so as someone who's already begun this journey, could you tell us a little about the kind of hurdles that you've faced, perhaps personally or professionally, and if you have any advice for us as undergraduate students?

Ronak Jain: Sure. One thing that often gets lost in all of this is the many challenging times. It's not like everything flows really smoothly, actually there are really stressful points, especially when you're applying. I think that more than anything, when you're applying to places, when you're waiting to hear, that's a period of anxiety. Then also as I said, first year, every place that I've been, has been very challenging. And that is part of the thing when you're moving from school to another school, or moving from university to university, again that first year you have to establish yourself. You have to make yourself known. You have to establish contact with professors, and again and again, every time you switch places, even if it's jobs, that proving yourself bit is there in the first year. So, first year, categorically I've never enjoyed, in any place. Second year is once you start becoming a little more grounded in your place, once professors or academics start realizing- yes this is a hardworking student. You do that by showing your work and dedication, and reading outside the topic. That kind of really motivates me, when professors say, or they start even remembering your name. That is a nice starting point, nice motivating point to begin off. So first year is, once you establish yourself, once you prove yourself, that's all about being grounded. Once you cover your academic ground,

then you move on to thinking about 'what should I do with research?' And 'where should I orient myself? 'So in terms of hurdles, self-doubt is recurring. I think none of us openly perhaps admit it to even our friends, but these are moments which again and again you think, 'am I going to be capable of getting this thing?', 'Am I smart enough to be here?' I mean we all use the term 'Imposter Syndrome', it's there in the first year of everywhere you start but also when you're applying, making these applications- Masters, PhDs, that's a constant fear- 'am I going to get in?' And once you get in, it's even harder. You were anxious all of this time and you were like, 'if i'm going to get in, it's going to be such a lifetime achievement' and you go to that place and you're like 'do I even fit in?' , 'am I smart enough as others around me are?'. So that I think, naturally everyone faces to some extent, but no one openly admits it, and it's okay. But part of that self-doubt will push you, is what I'm going to say. Having that self-doubt can also be somewhat healthy, because then it means that it's not like you're going to just sit back and everything is going to be fine because you've done it before. It will push you forward. At least that's how I guess you should channel it, that every time you face these hurdles, you're like 'I'm going to prove myself again, over and over again.' And that's fine. So, self-doubt you have to manage, it will recur. It still recurs, even over the last couple of days. I've been like 'really can i do this?' There have been moments where I've felt my academic peak has passed and I don't know how I got here. I've got some of the best education that can be had, I could just sit tight and be comfortable. But that's not right, you got to push yourself, you have to tell yourself that you constantly need to keep learning. As long as you're learning, you're good, no matter how tiny that learning is. But that growth element is really crucial and you've to push yourself to do it. So in terms of other hurdles, I started out being a really reserved person and that is kind of challenging in today's world. Because if you've noticed, academia today is a lot about presenting your work, communicating your work to everyone. Academic twitter, for example, there's a huge econ crowd on twitter. You need to be self-promoting yourself. That's not something that comes naturally to me. So even with giving this interview I pushed it as far as I could because that's not me as a person. I like to have this ideal, back-dated research view which is you sit at your desk, you do something, you publish it and that's it. You don't need to present it and you know, say 'it's my work and I've done this great work and it merits reading.' In fact, I feel the opposite. Once any kind of research work is done, I feel like that's it, it's not that great, I don't feel like people should read it, or I don't particularly feel satisfied with it. So that is challenging for me, and that will vary from person to person. Some people it comes very naturally. Professionally, that is a hurdle and I think the way forward is just practice and practice until you get there. Presenting, not saying no to opportunities to the extent that you can and just building yourself slowly but surely. It's presenting in your class, it's doing things like this. So one thing that I missed out on my research journey, even for my undergrad, I've always been part of this economics society or some other society where I've had to talk or present or gather a group of people. It's putting yourself out of your comfort zone but it all helps, and especially with academia today, I'm going to make a point because in economics, a lot of recent work has shown, gender is particularly an issue. It tends to be much much harder to see women excel in economics. Part of this reason can be this; we tend to be shy, and talking about myself here, don't

want to generalize, but we can be shier, we can be a bit more modest, but we really need to make a point to try and at least with our research work; own it and present it wherever we feel comfortable. And practice. Practice at every opportunity you get to. That's a professional thing.

Sometimes hurdles can just be, you're not getting ideas, but that's going to come at a much later stage in your lives. I'm going to say, when you're in your undergrad, when you're in your masters, ideas are going to flow and really take that tiny bit of effort. I wish someone had told me that earlier, open a word doc on your computer and save it as 'ideas', even if it's the silliest ideas you can think of, but just start noting them down. Because later when you get more into economics, those ideas are going to shrink. Because the more you learn a subject, the less creative you can get. And I've stuck with the subject for 9 years now, if I count school. It's harder, you need to think of fresher ideas. So I would really suggest, wherever you get a chance, open that one word document or diary and just keep that with you. Even if it's an idea that you get in your dreams and the next day you remember half of it, there was something vaguely about it, just note it down. So you can come back to it when you're at the PhD stage, just look over. Sometimes you'll find that they were silly, 'what was I even thinking of then?' But sometimes you might look back and say, 'that's really what I'm passionate about, it's been there in my head but I just didn't remember to look back at it a couple of times.' I guess that's most of the main hurdles that I've experienced and the other things can be when you're starting to work together and you're collaborating with people. That's a new thing for me because at Oxford and Cambridge, for the thesis and your dissertation, you have to do it yourself, you can't collaborate with people because it's an individual part of your coursework and grades, so you don't work together with others. But moving to Harvard, that's a totally different culture. They actually emphasize that you work with someone, because it's creative and also efficient to the extent that you get skills from other people. Learning from others is the quickest way to learn. When they were describing research to us at Harvard, they said that it can be really isolating, especially as a PhD student, you can get into your own bubble, you can get stuck asking for help etc. But if you have someone else who's also a PhD student, you can work together on something, even if it's as small as checking your code or brainstorming together on theory, working things out, proving things, taking parts of a proof and doing it. That can be really helpful, but the offside is when you're working with someone, there can easily be conflicts in terms of your working styles. You might want to do things really quickly, someone might take more time and there can be those clashes, so you need to be mindful of that when you're working, which I'm sure is part of any teamwork. But that comes on later on in your career, balancing how much you want to collaborate or whether you want to have all projects where you're collaborating with someone versus some project that's your own, that you can fall back on when you have all these conflicts. That's what I'm trying to do now, which is create my own project as well that can go on on the sidelines, that only I'm responsible for. That's all the hurdles that I think have come into my mind at the moment, I'm sure there are many more.

Editor: Do you see a shift in research and data collection methodology in the post-covid world, especially in projects that require tons of field work?

Ronak Jain: Right, I do think there is going to be a shift, I think there are particular fields of economics which are going to experience a shift in methodology, primarily development economics or other fields which are heavily reliant on field work, so survey data etc. At the moment the trend in development economics is being moved to phone surveys or online surveys wherever possible. But at the same time, the thing that's still difficult to adapt to, there are parts of the population that are so disadvantaged you might not even be able to reach them via phone or online surveys. When you're working with that kind of population, things cannot change, you just have to be patient and wait until covid gets over to conduct that face-to-face surveying or fieldwork. But I think a lot of the projects now have moved onto using phone surveys or online surveys, wherever they can work. In economics we talk about these exogenous shocks to economies that sets them on a different path. I think part of that is going to remain. Field projects, even going for work, to the extent that you can pull off using phone or alternative methodologies, you're going to try and do that. It's also easier to call up people than to be there or have surveys physically. We will have to wait and see, is what I'm going to say at the bottom line.

Editor: In the study on the covid impact on the labour market in South Africa, it was found that job losses disproportionately affected women, manual labour and the poor. So what in your opinion are the causes of that and do you think the same can be said for India?

Ronak Jain: Right, I think that's a great question but it's actually an area that we didn't get to concretely in the paper. So what I'm going to say is going to be broad-brushed and what I speculate might be the causes rather than exactly coming from the paper but here's my take- at least, part of the research that I've read, also in developed countries like US, UK, has also found similar kind of results. Manual labour is the hardest to get back into in this world, because of social distancing. Think of your house helper or maid servants in the Indian context. We would not have been able to have them over during the lockdown phase. So those kind of manual jobs, you absolutely cannot do remotely, because by definition these are manual. So it's kind of unsurprising that we've seen those go away. Especially, I'm sure if you've been watching the news in India, the first couple of months there was so much on migrant labour and sending them back home. That's all to do with the fact that you just can't function and these are not the jobs you can do remotely- cleaning, helping in the house or even construction, for example. For all of these you have to physically be there. With regard to the poor, there's a combination of factors. One can be that they tend to be involved in manual labour, so there's a subset, an overlap of people there. The other fact could be that when you come from a poor background, you're more likely to be in informal employment. And informal employment in India is also pretty high, something like 80% or over. Together with informality, it means that you don't have permanent

contracts or job security, so in any kind of downturn, you're going to be the first to lose your jobs, especially in this kind of situation. So that's the bit about the poor. Also, if you think of yourself as an employer, when you're facing troubles, who are you going to let go? Are you going to let go of the people you can replace easily? Sadly, the fact is manual labour or low-skilled labour, categories that the poor disproportionately comprise of, are the first jobs that are going to go.

We investigated the aspect of South African women in our paper, and women tend to be a lot more in manual occupations, and that was the overlap. That overlap explained quite a bit. It was not that they were less educated. Actually, they were slightly higher educated than men in the South African context. But they were disproportionately still more in manual occupations, the jobs that were lost, so that was explaining why women lost more jobs in South Africa. In developed countries, that's also been seen. In the South African or Indian context, the reasons are also that women are more likely to have to work when you shut down, when you're at home, you have more familial responsibilities- cooking, cleaning, taking care of your kids and that falls more heavily on you, I think that's especially true in India. Now I don't know culturally what's the context in South Africa, but India for sure. Informally when I've been talking to my relatives, or with my cousins who are married, they've been saying that it's been a hell of a time. It's like a full-time job- you have to constantly cook and you have to cook different dishes because you're home and you want a bit of variety. So that aspect of familial responsibilities falls more heavily on women, so that makes it harder to work from home.

Editor: So in the same study, one of the key points was that the high rate of apparent job termination means that the rebound is likely to be slow. So in your opinion what will this look like for India considering we're set to lose roughly 130 million jobs during the pandemic?

Ronak Jain: Right. Universally also, I think this is going to be a very tricky time. Initially, the forecast that came out said that due to the lockdown, the economies are going to be really badly hit, tourism, everything is collapsing but then we'll have a massive rebound once we find the vaccine, once everything is back on trajectory. But what this finding on job terminations is showing is that, it's not like these people are kept on hold. If these people were put on paid leave or unpaid leave, when an employer tells the employee that after this lockdown gets over, I'm going to hire you back but I'm not going to pay you in the interim, because of the situation, then we would've had a rapid rebound. It's just the matter of not having an income for these coming months, not going to be constantly working but you have something to get back to. But now when you have job terminations, which is, your employer said, actually these companies are shutting down and they're no longer going to have you back and you're going to be in a pool, as you put in a figure, of 120 million over. You're going to be among the pool, in that situation with also less businesses around. Maybe the hopeful thing we can imagine is that other businesses enter, the online industry is perhaps going to expand now. But even then with that kind of a pool of unemployed people, you're going to be really really competing

for jobs, and that's not going to be easy, like we slap back again, covid goes away, we find a vaccine and the next day, everyone is going back to normal. It's not going to be that. Every job that comes out there is going to have, goodness knows what kind of ratio of positions and vacancies to applicants. Recently in the UK, my dad was telling me that he read news articles that a temporary job opened for someone to help out at a restaurant and there were 400 applications even for that kind of a job. And these applicants were qualified. These are the scenarios that we will perhaps be facing when we go forward. The only thing we can keep fingers crossed for is that there are going to be new industries that hopefully enter the market or expand which will still create jobs, but it's still going to be a tough time. As we'd expect, it's not going to be; look this is over, we all snap back in and things go to the previous normal that we were in. All of these job terminations means, people who have lost their jobs are going to have to apply, wait and it's going to be tricky. It's going to take time to get back to normal, is what I'd expect.

Editor: Thank you for that. So in your teachers' incentives paper you mentioned different kinds of incentives and measured their effectiveness. With online teaching and assessment, in your opinion, which of these incentives do you think will be most effective during the pandemic?

Ronak Jain: Well, that depends on challenges. So,what kind of challenges are we facing? Is it that teachers are not effective in transitioning to this online technology and they need some training? It could be as simple as we don't need incentives, we just need to train teachers so they can adapt to this new way of teaching. Even learning zoom, for example, that's a start. So, to be able to do that or to be able to learn online pedagogy, like, okay, we cannot have the traditional way of just students speaking out when a question is asked. We need to adapt to those ways and structures so and so forth. Instead of incentives, it could just be a matter of retraining teachers to adapt to this new technology. Incentives (when you use them) you want to use them to motivate someone to do something they're not already doing. So, if you feel that teacher effort is really low once you switch to this online thing;the teacher is not as enthusiastic, not taking it as seriously, the way of teaching is not the same and so on, then you can think about these incentives. That paper actually used another experiment which was looking at what if you individually reward teachers based on their student's performance versus if you do it in a team. So what if you have all the teachers in the school and then you reward them if the score of all their students in the school goes up. So, you could do a similar sort of thing in the online era. You could imagine that you give teachers the incentive. Even when you're teaching online, at the end when you have these tests in online format or when you resume school and you have a physical in-person test, if the students improved, the teacher's going to get a reward. Hence, the incentive structure can be similar, it's just being applied to an online setting. But, I would place my bets more on retraining teachers and getting them to adapt to online teaching rather than incentivize it.I think, in fact, if anything, because they are home they're more freed up. They don't have to travel to work, so at the click

of the button they can turn on their Zoom and they can start teaching. So I would hope that those kinds of hurdles or other fixed costs of getting to school, getting to work, getting ready, all that is gone and they can just get out of their bed and teach, if they wanted.

Editor: In the same research paper, some of the problems that you mentioned that schools face also qualify as problems for Indian colleges, for example, professor absenteeism. So, in the light of that, do you think there's a need to extend that research to college professors as well?

Ronak Jain: I think actually that would be really nice. That would be a nice thing to do and I don't think anyone has thought that far because we just expect that by that stage (when you're teaching in a college) you would be motivated enough because you have bright students now. These students, they are adults that you have around. You can't just get your way past teaching them. If a teacher doesn't show up to a class of undergrads, they know that the students know that they're slacking. It's not like slacking arounds kids, to whom you can tell some stories or have absolute command over. So there I think it would be really cool to do such a study, it'd be interesting. But also, there's theoretical literature about and there's been some discussion about the incentives for professors in academia are not well aligned. What I mean by that is, they get rewarded for their research, they don't get rewarded for their teaching. When you're considering promotions or getting a higher post or even recognition in your own department , it mostly comes from your research, not your teaching. So, those incentives are messed up. There's a theory on the effects of incentives on multitasking. According to that theory, the problem with giving any kind of incentives is that things that are harder to measure and incentivize, they'll get ignored, when you incentivize something else. In this case, when you incentivize test scores or research output or publication. That's the metric, right? Publication is easy to see but not your quality of teaching, which is harder to evaluate. It's kind of natural. My answer would be yes, definitely it would be a cool thing to evaluate professors, I'm not sure how cooperative they'd be. They're probably smarter than us, so they'll figure out that they're part of an experiment or they're being analysed. So, all of these issues would be there. But, nonetheless, that would be a cool thing to do, to see how incentives can be slightly changed to motivate them to come to work. It was a surprise to me that you asked about professor absenteeism, I wouldn't have thought of that. The classic image in my mind is that professors turn up, they're not students, at least that's the kind of thing you see in Bollywood movies.

Editor: I think in terms of absenteeism, we're still on the luckier side of this debate at Miranda House because our college is slightly stricter about academics compared to other colleges but we can't say the same about all the colleges at University of Delhi.

Ronak Jain: Right, so then we should definitely do a study on that. Just make sure that the teachers don't realise that they're part of an experiment.

Editor: I think we could get interesting results because a lot of experimental economics has been conducted on students themselves, right? I think going into an economic background has changed our results to at least some extent. So, perhaps, the same would show up for our professors.

Ronak Jain: Exactly, well, that is one of your research topics. One of you should pick it up or collaborate and work on it. Avoid the economic professors because they'll find out that they are part of an experiment. Maybe professors from other disciplines who haven't been exposed to the farce won't realise. I'll be curious to know the results of that.

Editor: When NIRF does the ranking, it takes into account teacher absenteeism and student absenteeism also. So, that's very interesting because they already have that data and that's how the colleges are ranked.

Ronak Jain: That was a great point. When I was doing the fieldwork for my `incentives for teachers paper' in Delhi and I was going to schools, I found that absenteeism goes into the teacher evaluation as well. Records are kept for that, but the problem is that hardly anyone checks those records. There are no checks and balances about who is recording the absenteeism. I am sure that is not the case at university level. But, yes, If we allocate high enough weights to their attendance or their quality of teaching or maybe student evaluation, we will see a change in the academic structure.

Editor: Job security is expected to be even more precarious in the post pandemic world than it was before. How do you think this will change decisions that college-aged students make?

Ronak Jain: This is actually a very challenging period, especially when the next step for college students would have been to look for an academic job (if that's what you're pursuing). Job candidates who are in their final years of PhDs at the moment, I'm sure they are having a very stressful year. They can't step out because there are no jobs, there's hardly anything. Universities are actually pulling back funding and hires. They are

even firing people who have temporary positions and posts like assistant professors are being pulled back. So, no wonder it's a tough time, the next couple of years are going to be tough. As students, you don't need to worry. You have years ahead of you. By the time you get through your PhD, you will be fine. Hopefully, this 2020 initiated mayhem will be behind us by then. My surf is not worried about the job aspect because when you're focusing on your research, you don't need to worry about what's going to come next or are you going to have a job at the end of the day. I know that's the practical aspect but I would suggest being an idealist for some of the coming years. Focus on your research because it is fun to do it and there is no better time to be engaged in studying. Actually, you should consider yourself fortunate that you're not at that position or that turn of life where you had a job and you're concerned that you're going to lose it, because that is stressful. What's going to come in the future? That will be okay. Do the things that you have never had time to do. In our normal lives we always crib about how we're drowning in our course work and we haven't had a chance to read or explore things. Do that now. Take the time that god has given you to focus on things that you really enjoy. Think about ideas. It's tough and I don't want to underplay that but thinking about that aspect of a job is not going to be of much use. It's not going to give you anything but more anxiety. This is the best time to be a student, is what i'm telling myself. So enjoy that aspect. As a student, you've got the most comfort. You're not in that actual real world yet that you'd have to be worried about the precariousness of job security. So, hold that thought off until you need to think about it. It's all about telling ourselves these little stories that will keep us going.

Talking about your case, you're undergrads. I was not thinking about whether I'll have a job or not when I was an undergrad. Throughout my life I've always been in this tunnel, I've always seen the next step and I've really focussed all my energy on that. During undergrad, the final years of it , I was only thinking about what was next, which was masters. So I focused on: what do I do to get myself into a masters programme? Then, what do I do to get myself into a PhD programme? And now, it's just how do I do my research? So, look at the immediate next steps, not too far into the future. I know economics teaches present biases are a bad thing but now is the time to be present biased,so,be present biased.

Editor: How do researchers and PhD students find people with similar interests to collaborate on projects?

Ronak Jain: That's a really nice question. Sometimes it evolves very naturally. Some of my first co-authors were actually my friends at Oxford. So, I had this co-author, we were doing a micro theory class together and after the class we used to sit together and study. During those sessions, we realised that we are really good at doing proofs or discussing things together. You notice that when you're studying with someone or you're completing your assignment. Sometimes, a collaboration can evolve that way. So, my first co-author was my friend who I met in an economics class. So, that's one way. The other way can be finding collaborators in the field you specialize in. So, because I did research on teacher incentives and human capital in my

undergrad and so on and so forth, I've really tunelled in, somewhat, into the education sphere. So, then what can happen is sometimes when your classmate thinks about a research idea in the field of education and they know that you've got some aspect of expertise in that field, they might approach you to collaborate. You might make other connections, your classmates or some of the other people you meet at conferences. Sometimes, even your professors might introduce you to someone who is interested in a topic which you're interested in and then you can see whether you want to collaborate on something. So, the answer to your question is, it's really a mixed bag. I started out with someone who was a friend, they were my first co-author. Then, I've come to collaborate with my classmates. One of my current projects is with another classmate of mine at Harvard. His expertise is not so much in education but because I had this expertise in education, he thought of an idea on education and we thought why not collaborate?
The collaboration can come to be from a purely professional standpoint, which is, I have a skill that I can contribute to a project and my collaborator has thought of an idea, so we can work on it together. It can also be that you're friends with a person and you've been studying together, and you think that both of you have things to teach each other and make a project a success. Sometimes, collaborations can emerge with people you meet at conferences, that happens too. You meet someone at a conference and you start talking about your research and someone drops in a line, like, "Hey! I'm working on this project. Would you like to be involved?" So, it's a mixed bag and I think it's hard to judge which is going to be a good collaboration. That is going to vary because every single person you meet is going to be different and you are going to have different project dynamics with each one of them. So, you just have to navigate and be open to experiences. Sometimes they will work out very nicely, unexpectedly so. Sometimes they won't. So, take what comes with the tide and learn from those experiences along the way.

Editor: What has your routine been during the pandemic as a researcher?

Ronak Jain: Luckily, the UK has been good in the sense that it's always allowed one form of exercise. So, even during the lockdown, I at least had that luxury to take a round around my neighbourhood. In terms of routine, somewhat ashamedly, I have still stuck to the US time zone. So, that means I get up at 10 am or 11 am which I tell my parents, it's still 6 am US time so I'm still very productive. So, late start to the morning, but then I do make the time to do some sort of exercise, yoga, meditation or even just jogging because I do think that it is a stressful period and that some form of exercise is always good. It's not part of my research routine per se, but I think it's very important to do something that's not just studying to keep yourself in that positive mindset. After that, because I'm collaborating with people, I have calls and I discuss topics with my co-author, so that usually takes up an hour or two of my day. Then, I read a couple of economics papers. Now I am in that zone where I feel like ideas are not coming really naturally or as smoothly as they used to. So, I thought why not take this time, read some economics papers and just take it easy on myself. No pressure, just think of ideas that come around and take it one day at a time. So, I do that for a couple of hours, then I do wall painting, something I've picked up during the lockdown. It's really therapeutic, so I recommend it.

If you have lenient enough parents that are going to let you do that. So, that takes up an hour or so. Then, binge-watching a lot of netflix. You're gonna regret asking this question because you're not gonna see a lot of research happening. This is a complete contrast to what my day would look like had I been on campus in the midst of the coursework and all. My routine at that time used to be to get up at 8 am, spend 8-10 hours in the library and do work. It's a different thing but I think that any work that you can do in this phase is good. You shouldn't be too harsh on yourself.

Editor: That's definitely more productive than me on any average day.

Ronak Jain: That's okay. Everything is not about being productive. Productivity is an overrated thing. I think something that the lockdown does teach us is that it's nice to be able to have that skill, and I would call it a skill, because a lot of us realised that we've always been in that zone that we're constantly doing something. Even to just relax and not have anything to do, I just can't imagine how people lived before us because they were not like this. They were okay just living in their homes and not having things to do and that's a skill. It's fine not doing anything, it's fine not being productive.

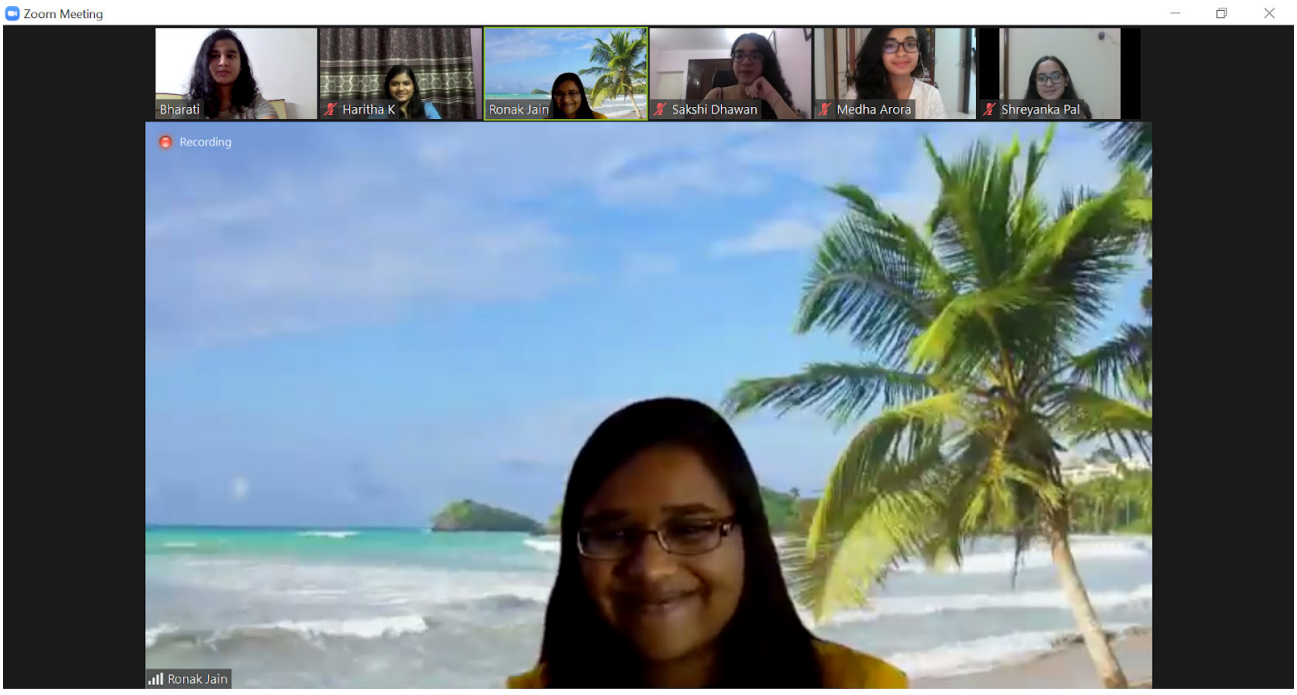
Editor: You are like us in many spheres: you're a woman, you're from India and you're an economics researcher (which we are aspiring to be). So, when you went to the US and the UK, how easy was it for you to adjust to the entire atmosphere?

Ronak Jain: I moved when I was 13,with my parents (it may not be the same for you). I left India after the 8th standard. It was really tough for me to adjust to the school life here. I remember, I wasn't even able to hear what they said because they spoke so softly. But in the university sphere, that's not true because professors are themselves international, they come from different parts of the world and they speak loudly and clearly. You won't have that big of a culture shock at university level because one of the legacies of the colonial system is that education systems in India and the UK are really similar. So, you have a similar sort of undergrad, a similar sort of class style and lecture style that you would have in India. So, UK to India, university wise, I don't think there would be a massive difference, but UK to US, interestingly, has also been very different. That was more of a surprise to me. It's different in terms of the academic culture in economics. In the US, it's more about collaborating, more about constantly presenting your work. So,US to UK is more of an academic culture shift rather than a pure culture shift. My takeaway would be that if you're considering going abroad for studies, you wouldn't find that much of a challenge because a lot of the cohorts are very internationally based. So, you won't feel like you don't belong which was a hurdle for me when I initially entered the school system. The school system is different in the simplest ways as well, like in India, we don't move, teachers move. Otherwise, there isn't much of a difference. Also, globalization and academic conferences happen in so many pockets. So, that bridges the international gap. ISI has this development

conference every year, DSE has a development conference every year. At these conferences, academics meet and discuss things with each other. So, there is not as much of a divide as it used to be there. For example, now our classes are happening over Zoom and so are yours. Part of globalization has meant that we connect in a lot of ways, the internet has been a great source for that too. A lot of courses are happening which are open source. edX is a website that has coding lessons and which students can learn for free. So, these kinds of resources are meant to remove that stark difference you find between cultures. When you're doing an online course, you're listening to those lectures which are happening in America. So, you're being exposed to that lecture style. So, as an undergrad, a masters student or a PhD student, you wouldn't find so much of a culture shock moving across countries.

Editor: This was a very interesting interview. Thank you for joining us today and I think we all learnt a lot.

Ronak Jain: It's a pleasure. Every bit of advice that you can get is really helpful. The biggest caveat with all this is that every person has had a different experience and there are no golden rules. Everyone will tell you different things and it's valuable just to talk to different people. It's not necessary that what others have experienced, you'll experience as well. Low and behold, in seven years or nine years down the line, you'll be telling your own stories. All of you will have different journeys, you'll have your own set of lessons. My advice is listen to a lot of people, don't follow just one.



RESEARCH PAPERS

Agricultural Reforms, and the quagmire of MSP

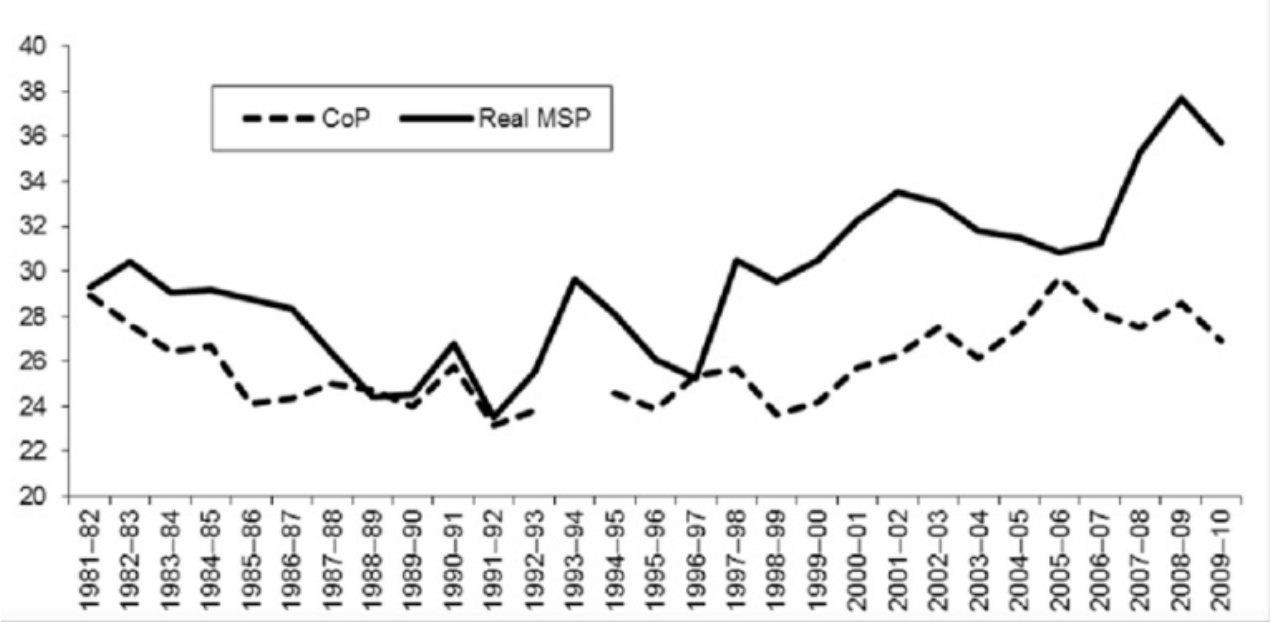
By- Sri Hari Mangalam, Pratyush Nigam, Aditya Kishore,
and Ishan Khare, NUJS

Introduction

The recent Two Thousand and Twenty Farm Acts were passed in an air of controversy. Multiple farmer's organization's and leaders of the opposition staged protests against the three enactments. The protestors were extremely unhappy with the changes that the three bills would bring in the agricultural field. A moot point for all individuals and organizations protesting against the said bills was centered around the future for the provision of "Minimum Support Prices" in the country. The new bill viably replaces the APMC structure and adopts a more open process, where buyers and sellers can transact with one another beyond the boundaries of a Mandi. The set up effectively defeats the most generic feature of a market i.e., a central place for the exchange of goods formed by buyers and sellers collectively. Consequently, The Farmers Produce Trade and Commerce Act, often dubbed as the APMC Bypass Act, 2020 essentially negates the characteristics of all Market Committee's in the country and leaves it upon the private investors and individual buyers to directly deal with the farmers. Accordingly, the removal of the APMC's may have a drastic effect on the availability of the Minimum Support Price feature to the farmers. Most states like Punjab and Haryana buy their farmer's produce at MSP rates via APMC Mandis. The Mandi's have purchase centers where the farmers can come and sell their produce at minimum rates. Accordingly, as per Siraj Hussain, one of the previous Agricultural Secretaries of the country, the removal of the Mandi's can weaken the precursor to sell at those rates and the farmers could face blockages in exercising this provision.However, as per the Modi government, the three new Acts would in no way impact MSPs and the farmers would be allowed to sell their produce at a basic rate. Regardless, since the three Acts do not talk about MSPs at all, and a tweet from the prime minister isn't enough to placate the worries of the country's producers, protests are being held across the country. Accordingly, this portion of the paper is an attempt to analyze MSPs, its development and availability of legal support, impact on farmer's incomes before the three acts, situation post the Acts, and other ancillary factors which may affect farmers across the country.

Minimum support price: Origin and Role

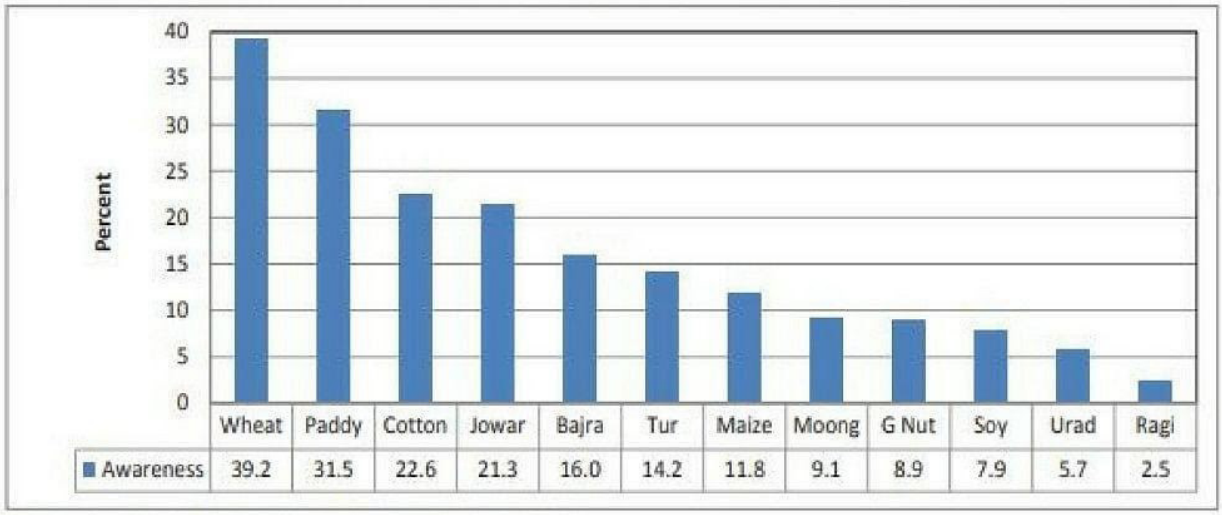
Minimum Support prices were introduced in the early 1960's in the agriculture sector to support the production of a High Yielding Variety of crops. MSP's were essentially meant to be the minimum amount at which the government would purchase a particular crop in order to support the farmer. In other terms, an MSP is the amount which the government pays to buy a particular commodity. The amount is fixed by the government so as to ensure that a farmer can in fact ensure a return on his/ her cost of production or have a gainful return on investment (ROI) from the amount that he/ she has invested in growing the crop. Accordingly, the trend for MSPs has seen a gradual increase over the years with an initial dip in the early 1990's. The graph below depicts the trend of MSPs with respect to the cost of production for wheat.



The provision was announced by the government in the wake of the green revolution and exists as a guarantee to the farmers, even before they sow their crops, that they would be able to acquire a specific amount for their produce, despite the market conditions. The idea behind introducing the provision was to guarantee farmer rights; however, due to low levels of exposure and high illiteracy rates, the farmers of the country are not even aware of this supplement. As per a report by the National Sample Survey Office, less than 25% of rural households are aware of Minimum Support Prices for different goods.Further, according

to a 2013 survey for farmer awareness, knowledge about the availability of Minimum Support Prices for different commodities still lies at abysmal rates. For Instance, only about 2.5% of Ragi farmers know that their crop can be sold at a guaranteed price to the government. The graph below depicts farmer awareness about MSPs for different commodities in 2012-13:

Chart 2.10: Farmer Awareness about MSP of major crops: July-December 2012



Note: For wheat data relates to January-June 2013
Source: Some Aspects of Farming in India; NSS 70th Round (January– December 2013)

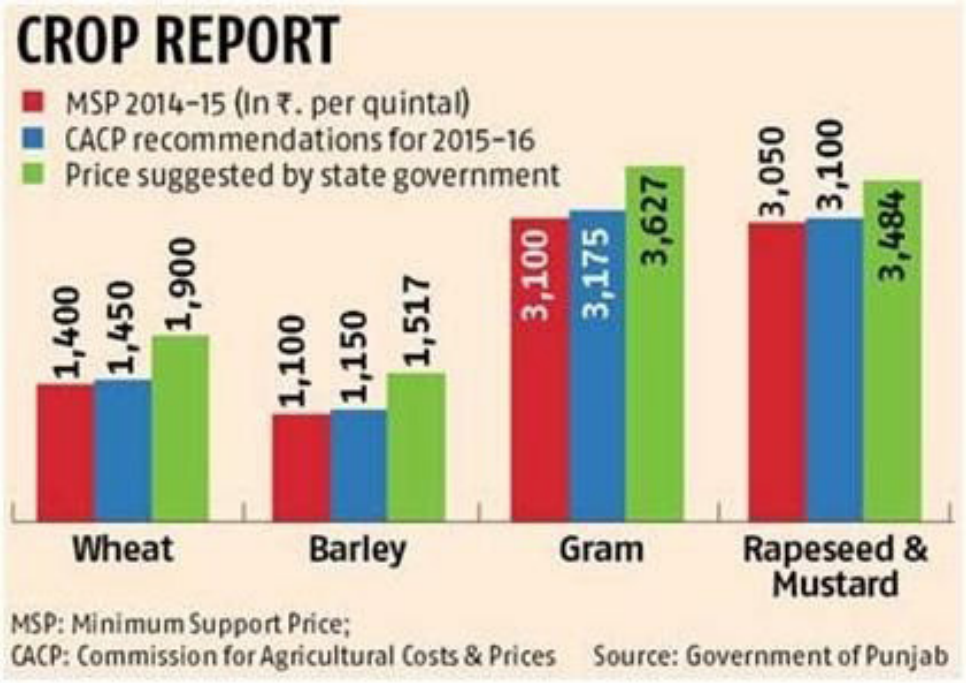
Further, the idea behind the formation of the Agricultural Prices commission in 1965 and introduction of multiple aspects such as the Minimum Support Prices and Public Distribution Systems was to provide a protective distribution Measure. However, due to ineffective application and losses in actual transposition of commodities under the MSP, Indian farmers have been unable to enjoy the benefits of the said provision. Accordingly, there exists a very heated debated around replacing the Minimum Support prices model with a price deficiency structure for farmers, in order to create a more effective system; however, currently the MSP approach is followed.

Accordingly, the government sets the Minimum support price for a certain number of commodities as per the recommendations of the Commission for Agricultural Costs and Prices and various state governments and central departments. Originally, the M.S. Swaminathan Commission, had recommended setting Minimum Support Prices at more than 50% of the total cost of production. However, the policy is not often feasible and the government has historically set varying MSPs for different commodities. Most recently the Modi government announced MSP rates for more than twenty-two commodities, out of which six were given

incredibly high rates. The government has increased MSPs for crops by more than 6%. For instance, the MSP for wheat has been hiked by fifty rupees now totaling an amount of Nineteen Hundred and Seventy-Five rupees per quintal instead of the earlier Nineteen Hundred and twenty-Five rupees. Accordingly, in an effort to analyze the impact of MSPs, their growth over the years and various considerations used to support their production, it is important to further analyze this provision's initial growth and the determinants used by the government to establish different rates.

Minimum support price - Development, Impact and Casual elements

Historically, Minimum Support Price was one of the multiple provisions introduced by the government to support the growing agricultural sector of the country. In the early 1960's, India was facing a food crisis in most parts of the country, and technological inputs clubbed with governmental efforts were seen as the required elements to ensure food security. However, only ensuring greater technological implements weren't seen as enough to support Agricultural growth and institutional backing was necessary to frame the required dynamism for the sector. Hence, a number of reforms were introduced to help support technological growth and ensure systemic development of the seector. One of the measures that the government introduced was a revised set up for land reforms in the country i.e., the third phase of agrarian reforms. The central government and various states worked on introducing new measures to ensure greater equitability. A few institutional steps taken can be categorized as such: a) Lowered ceiling limits and effective redistribution of surplus land, b) new tenancy rules, c) changes in agrarian structure and computerized land records etc. Accordingly, the next institutional step was ensuring a more efficient system for agricultural administration as well as effective implements to provide agricultural education. The new implements ensured higher levels of agricultural literacy for farmers, and greatly structured the work of the Indian Council of Agricultural Research in the country. The government also nationalized a multitude of private banks in order to provide greater credit facilities to the farmers and ensure against unnecessary exploitation by private corporations. An element that, unfortunately, the government has failed to recognize for the three new enactments. Regardless, the steps taken were clubbed together and the most transformative idea introduced was the formation of a price policy for the particular field. The government envisaged growth in agriculture through price incentive and cost-based support. A new committee under L.K. Jha was formed to suggest the required inputs for a new Agricultural Price Policy for the country. The committee made a series of recommendations to the government and later on provided the base for the formation of the Agricultural Prices Commission in early 1965. The view of the commission was to provide a balanced and integrated price structure which supports the farmers of the country and gave due regard to the consumer as well as producer's interests. The commission made yearly recommendations about a minimum support price for farmers in the country and ensured that the best technology package is adopted so that the farmers are able to produce as efficiently as possible. The commission's recommendations and the state's suggestions are used to formulate the yearly MSPs. The graph below compares the two determinants and the actual MSP for 2014-15:



Accordingly, even though the MSPs are established by the government as per the recommendations of the states and the CACP, there are various determinants that the commission has to use in order to form the required support price for a year.

The commission analyses the Cost of production of different commodities in various states and comes with a particular price that would indeed support the farmers and establish a minimum floor price.

The commission uses both micro and macro level aggregates for a hectare as well as quintal-based analysis. Further, it covers two types of costs of the form C2 and C3. The C2 costs are those which include the expenses inculcated by the farmers for production of goods in the form of cash or kind. It includes elements such ROI on land, labor input of the farmer's family etc. The C3 costs essentially account for the managerial remuneration from a commodity. It is calculated by adding the 10% of the C2 costs and the actual C2 costs together to cover all ancillary factors (10% of C2 + C2). Accordingly, the commission takes into consideration a certain number of determinants to formulate the different types of costs. A few of the determinants are as such: a) Production costs) differing input prices, c) Market trends, d) Demand and Supply for a good, c) Inter crop parity, f) International situation etc. The factors combined together are used to allocate the MSP for the year. The table below elaborates on the different determinants as per individual categories:

Production Related factors	Supply factors	Ancillary factors
Cost of Production	Crop Area	Parity between price received and paid for producers
Input Price	Productivity	Effect of subsidies
Price parities	Offshore trade	Original Costs
Market demand and Supply	Processing amounts	
Living Costs	Transportation and administration amounts	
Inflation	Levies and other administrative costs	
Global costs	Domiciliary product availability	

Table Depicting different determinants for MSPs divided into three categories

Accordingly, to further analyze the idea of Minimum Support Price in the country it is essential to study its impact on farmer's incomes and analyze whether the government is legally bound to provide support rates or not.

Minimum support price - Farmer's Income and Legal Backing

Minimum Support Prices are often understood as the basic structure for farmers to receive a return on their investments. It is what sets the floor price in the market, below which the price for a particular commodity cannot be perceived.Hence, MSPs are treated as a benchmark by farmer's which allows them to calculate the minimum amount that they can receive on a commodity, since the government's rates are essentially a base price. However, the actual scenario is quite different and often the market rates fall below what the government limit is and the price structure doesn't always benefit farmer's or doesn't have the required effect on their income. The table below shows the parity between Market rates and the MSP for Paddy in different states for 2019-20.

Table 2.4: Market Prices vis-a-vis MSP of Paddy in Major Producing States in KMS 2019-20 (Oct 2019 to Jan 2020)

States	No of days market prices reported	No of days market prices were above MSP	No of days market prices were below MSP				Average difference (%) between market price & MSP
			< 5%	5%-10%	10%-15%	>15%	
Andhra Pradesh	121	68	50	0	1	2	2.4
Assam	42	0	1	5	8	28	-17.3
Chhattisgarh	122	0	36	20	40	26	-10.4
Tamil Nadu	119	3	46	37	26	7	-7.4
Telangana	123	31	48	29	14	1	-4.0
Punjab	64	64	0	0	0	0	1.3
Uttar Pradesh	123	3	45	49	23	3	-6.9
West Bengal	123	30	74	18	1	0	-2.3

Source: 1. AGMARKNET, Directorate of Marketing & Inspection (DMI), Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare
2. Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare

Accordingly, the price model is often unable to actually support farmers because of ineffective implementation and troubles execution.

Price support measures often turn out to be ineffective due to a number of factors. A few of them are as such: The general model of hiking MSPs without providing the requisite infrastructure results in only a temporary solution. An immediate rise may be seen in farmer's incomes because of an MSP hike; however,

for long term growth, the government must improve the infrastructural elements as well. Further, MSP calculations often include costs which aren't always comprehensive and create structural issues for farmers. The CACP and state governments often refer to A2 (sowing costs) and FL (Labor costs) costs to calculate yearly MSPs. However, these factors aren't easy to determine and strong arguments are made stating that only C2 costs (land rent, imputed rent of capital) which are far more comprehensive should be considered. Moreover, MSPs are essentially a single price policy for the entire country, and the determining agencies often fail to consider the varying needs of farmers producing in different situations. For instance, a farmer producing in a dry area will have different needs and support requirements as compared to one who produces on a more cultivable field. However, MSPs situate a single price for all farmers and hence ignore the differing needs w.r.t individual factors. Further, the sole use of MSPs and ever-increasing hikes can often lead to a glut for the government, hurting the interests of the farmers in the long run. Too much of a hike can lead to an inflationary rise in prices and can even hurt the government's treasury if they aren't able to sell of their produce. For instance, in 2015, the Modi government increased the MSP for pulses by a huge margin which did in fact increase production. However, a predictable glut followed where the government was unable to sell of its purchases and farm income fell, fueling rural distress. Therefore, sole reliance on MSPs and an ever increasing hike doesn't always have a positive impact on farm income. Additionally, due to a lack of effective implementation, MSPs often are announced for twenty or twenty-three odd commodities; however, only two or three are actually ensured. Hence, MSPs aren't always as effective as they are considered in theory and multiple determinative factors can hurt its implementation in practice.

Accordingly, in order to further analyze the status of MSPs in the country and the legality of farmer protests in favor of guaranteeing MSPs, it is essential to examine whether the government is legally bound to provide Minimum Support Prices or not.

MSPS And Legal backing?

The weakening of the Mandi system has caused major protests across the country, where most farmers are protesting against the fear of losing out on the MSP provision. However, before we analyze how the new farm bills impact this provision, it is important to understand whether the support prices exist as a legal right for farmers or are they just a governmental policy?

Minimum Support Prices were introduced as a support policy in addition to other initiatives such as the Public Distribution system. However, unlike the Public distribution system, the government isn't legally bound to provide support prices to its farmers.

The Commission for Agricultural Costs and Prices is not a statutory body and it does not have any legal teeth. It is only seen as a wing of the agricultural department or a sub division for the government, which has no legal succor. As per Abhijit Sen, Former Chairman of the CACP, MSPS are only policy implements that are a part of the government's administrative decision making. Further, in the midst of the protests against the new farm bills, the TNCC president T.S. Alagiri questioned the government's intentions since MSP's weren't mentioned in any of the bills. He maintained that if the Modi government really wanted to help, they would have legalized MSPs. Another recent instance were MSPs weren't regarded as legal rights.

Further, the body responsible for ensuring that the farmers are able to sell their produce at the Support prices is the Food Corporation of India or the FCI. It is the duty of the corporation to ensure effective price support operations; however, there is no legal mandate behind this duty/objective. As per the Agricultural Produce Marketing Committee Act, 2006 the APMC's are obligated to ensure that the farmers are able to sell at base prices and the FCI provides open ended procurement. However, without a legal right available to the farmers the said provisions are unenforceable and don't delineate an effective remedy. The situation for the farmers currently is such that the government can choose not to provide MSPs whenever they wish to. A comparable analogy would be if the fundamental rights are made available to the citizens of the country but Article 32 of the constitution was invalidated. The currently unlegalized sphere relegates the use of MSPs as political Jhumlas instead of actual implements which may benefit farmers.

Regardless, there is precedence for legalizing such a provision. The government legalized the public distribution system via the National Food Security Act, 2013. Once the UPA-II government passed the Act, access to PDS for all priority households was made a legal right. These households could now legally enforce their right to obtain 5 Kilograms of food grains at rupees two per kilogram for wheat and rupees three per kilogram for rice. Similarly, Sugarcane is one commodity which has statutory backing to enable MSPs. However, the commodity is governed by the Sugar Cane Control order of 1966 under the EC Act, and hence is a lone provision. Consequently, MSPs aren't a legally enforceable right for farmers and for an actual change to be brought about in the Agricultural sector, give this provision legal backing.

Accordingly, in order to astutely understand the new acts, it is more than essential to cover the changes that it might bring for MSPs and how the farming sector would be impacted if MSPs are indeed removed.

The FARM BILL'S Impact and A Non-MSP Regime

The nation-wide protests against the new farm bills are centred around one basic aspect that is the possible removal of the Minimum Support Price provision. As established above, MSPs don't have any statutory backing and are only a governmental policy. Hence, the government can validly remove this provision and not provide support prices to its farmers.

The three new bills at a certain level do indeed threaten the structure for MSPs; however, Narendra Tomar, the agriculture minister, has repeatedly ensured that the MSP provision will in no way be removed. He maintains that the bills essentially aim to free the agricultural market and are in no way related to the Minimum Support Price Provision. However, different state governments, do not agree with the centre's assurances and have moved their own amendments to nullify the three bills. Punjab and Haryana have been amongst the first few states to pass their own bills. On October 20, 2020 the Punjab government nullified the three bills by unanimously rejecting them in a special assembly and passing their own amended accords. The state has relied on the Punjab Agricultural Produce Markets Act, 1966 to pass the amendments and has claimed that central bills have gravely ignored the interests of the small and marginal farmers. The Punjab government used the 2015-16 agricultural census to show that close to 85% of the farmers in the state were small and marginal and the new acts could greatly hamper their interests. The MSPs if indeed removed would allow private players to establish the base limit at which the market would transact for a particular commodity, and such extensive privatisation could greatly hamper the interests of the small-scale farmers. Further, in a Non-MSP structure, private sale and purchase of goods and commodities could change the demand relations for different products where the farmers would be at the mercy of corporates and would have to produce according to their needs. Additionally, if the government was to simply revoke the MSP provision without providing a satisfactory replacement or a similar support structure, a huge chunk of farmers would essentially be abandoned and would be left without any institutional support. Further, the government's refusal to extend any form of debate over the said provision only adds fuel to the farmer's fears.

However, even though there have been widescale protests against the possible revocation of MSPs, the real scenario for farmers and whether the provision actually benefits them is quite different. In practicality, only a small number of farmers are actually able to exercise their MSP rights and get a minimum amount for their produce. Even though the 6% estimate which is an often-quoted factoid isn't exactly correct, the actual usage of MSP rates in the country is still alarmingly low. The tables below shows the relationship between the commodities produced and the amount procured by the government at MSP rates in 2019-20.

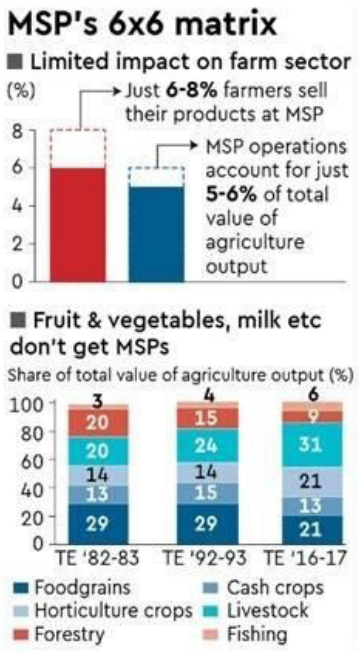
GOVERNMENT PROCUREMENT VS. PRODUCTION IN 2019-20

	PROCUREMENT (1)	PRODUCTION (2)	(1) AS % OF (2)
Rice	51.38	118.43	43.38
Wheat	38.99	107.59	36.24
Cotton	104.62*	354.50*	29.51
Chana	2.10	11.35	18.47
Arhar/Tur	0.72	3.83	18.80
Moong	0.14	2.46	5.69
Mustard	0.80	9.12	8.78
Groundnut	0.71	10.10	7.03
Milk**	18.53	187.75	9.87

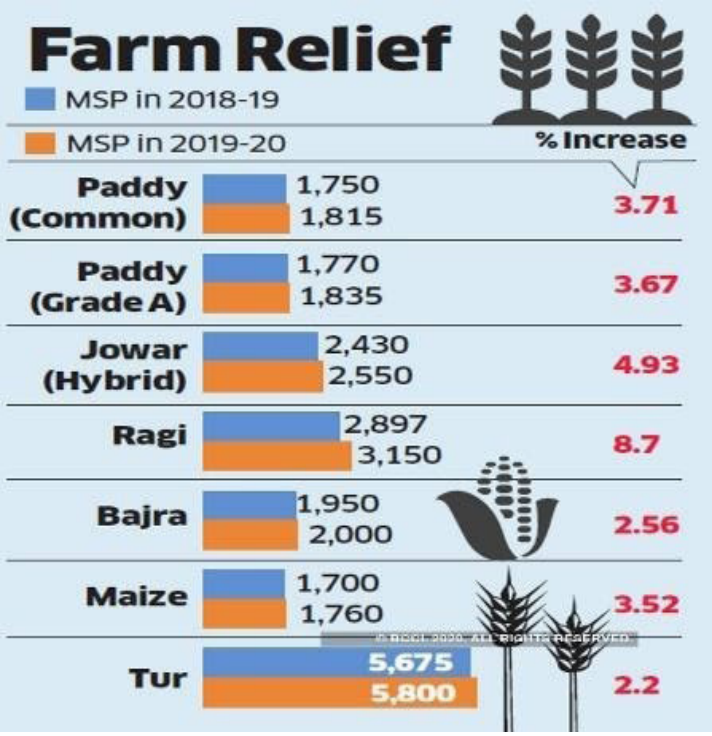
Lakh bales of 170 kg each; (All figures in million tonnes)

***Data is for 2018-19 and procurement by dairy cooperatives.*

Source: Food Corporation of India, NAFED, Cotton Corporation of India, National Dairy Development Board, Ministry of Agriculture & Farmers' Welfare and Department of Animal Husbandry & Dairying.

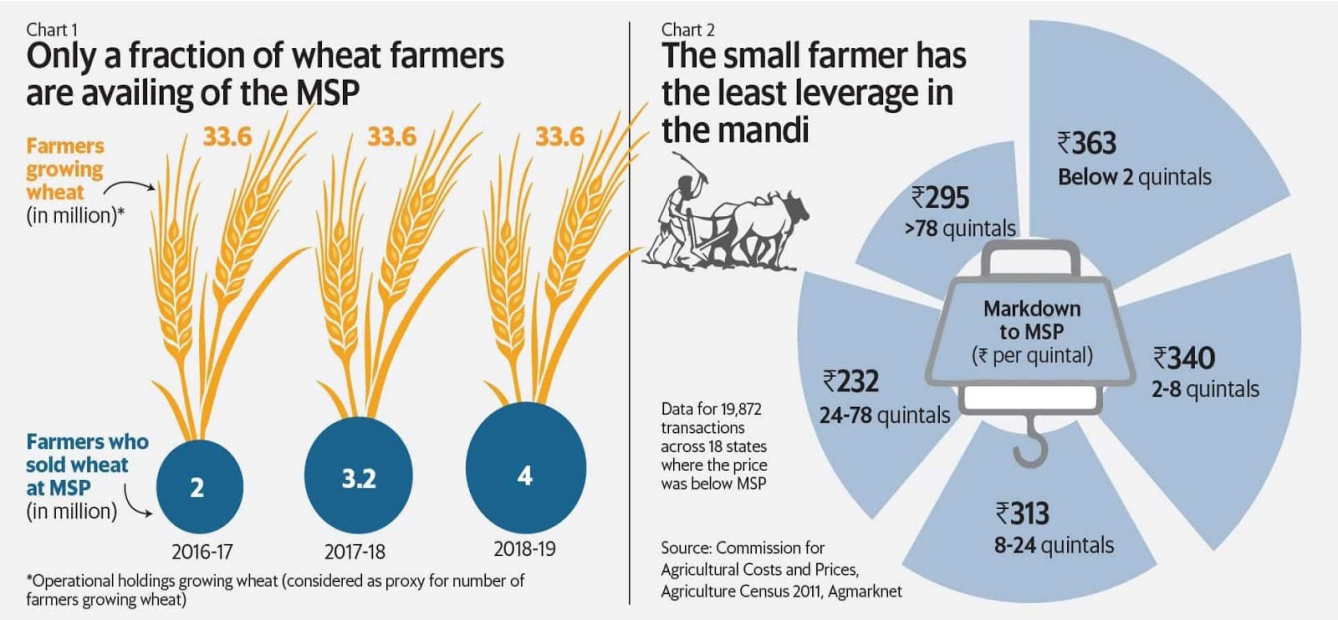


Furthermore, the MSP provision puts a burden on the government's treasury and creates huge economic costs for the Food Corporation of India. Historically, the government has extensively hiked MSP rates for different commodities; however, with each hike, the burden on the FCI keeps on increasing. The table below covers the increase in MSPs for Kharif crop in 2019-20. Noticeably, all commodities have seen a more than a 3% increase each.



Accordingly, with the systematic hike, economic costs keep on rising as well. The economic cost for wheat comes at about Twenty-Seven rupees per KG and for rice a stifling Thirty-Seven rupees per KG. Additionally, the FCI's burden which is currently touching close to three lakh crore rupees isn't depicted in the annual budget and the corporation is advised to keep borrowing continuously.

The MSP provision often fails to actually help the small and marginal farmers and greatly increases Food Corporation of India's debt. Further, another reason for the general failure of the MSP position, and the rather unaffected state of the Indian agricultural sector, if it is indeed removed, is because of the lack of an agriculture market information system. Technological advancements have allowed farmers to track the development of different crops to the tee; however, the lack of system which delineates the demand and supply relations in the market greatly affects the applicability of MSPs. Most small and marginal scale farmers are either unaware of the MSP provision or don't know which way market demand for agricultural produce will sway in a particular year. Hence, due to lower levels of knowledge and scarcity of information about market trends most farmers won't really be affected if the MSP provision is indeed removed.



Additionally, another reason why the MSP provision has benefitted only a small number of farmers and a situation where it doesn't exist won't necessarily impact a large share of producers, as mentioned above, is the method of calculation used by the government. Ideally, the government should consider only C2 costs which are much more comprehensive; however, A2 and FL costs are alternatively used which leaves out imputed rent and Interest on land or capital. The Modi government has often used this method to show an MSP which is 50% higher than the cost of production. However, since multiple types of costs are ignored the MSP rates don't necessarily benefit farmers as much as they should.

Accordingly, if the MSP system is removed entirely, it is possible that a certain section of farmers will suffer from not having a base price and may even become puppets for large corporations. However, since only a small percentage actually utilizes MSP rates because of failures in implementation and lack of knowledge, a complete removal won't necessarily impact the large share of India's producers.

Conclusion

The Minimum Support Price provision was introduced in the 1960s to support the dwindling agricultural sector of the country. However, today the situation is quite different, and even though farmer incomes haven't improved greatly, the economy at the least sees surplus production. Accordingly, the Minimum Support Price element has seen a rather tumultuous journey where the provision is often used by different governments as political jhumlas. However, MSP rates have at least helped a certain percentage of farmers gain fruitful returns on their investments. Unfortunately, the number of farmers that have actually been able to utilize this provision has been greatly restricted and hence a complete removal won't necessarily impact a large majority. Consequently, the MSP structure requires a number of reforms for a more effective implementation and if in any case the price model is entirely abandoned, the government must provide a similar or supporting infrastructure for farmers so that they aren't left to the mercy of corporates. In conclusion, due to ineffective implementation, MSPs aren't utilized widely; however, a complete removal without a backup structure can indeed hurt the interest of India's cultivators.

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Higher Education And Placement Prospects: In The Offing Or Far Off?

By- Rishika and Vidushi

Introduction

Employment plays an imperative role in incentivizing education. The trail of thought that motivates people to educate themselves; No qualification-No job-No livelihood-No standard of living, is a rough tool to understand that employment and education don't lie far from each other. However, a similar connection between different levels of education and campus placement is yet unfounded. As students gear up for the placement interviews that will land them the job best suited to their resumes, the companies draft criteria for selection of the new recruits. Of the many criteria, one could be the level of education. Do companies care about the number of degrees that their potential recruits possess? Do students go for higher education in search of better jobs and more offers? Through this research paper, we try to find the linkage, if any, between the level of education and campus placements.

Objectives

1) To determine the relationship between the level of education and campus placements.

2) To ascertain the relationship between affiliation of college i.e., government or private and campus placements and the number of college placements. 3) To find the effect of the number of recruiters on the average number of college placements.

Literature Review

The Trends in Education & Employment

While emotional intelligence, resilience, and learnability are a prerequisite for increasing chances of employment, the most in-demand jobs require graduate credentials. According to the data presented by Tomas Chamorro-Premuzic(2020), In the U.S., the number of graduate students has tripled since the 1970s, and according to some estimates, 27% of employers now require master's degrees for roles in which historically undergraduate degrees sufficed. However, another set of noteworthy data presented in the Tomas Chamorro-Premuzic(2020) include that most companies have people in place to upskill and impart essential knowledge required to the new recruits. Most Fortune 500 firms end up investing substantially to reskill and upskill new hires, regardless of their credentials. For instance, employers like Google, Amazon, and Microsoft all pointed out that learnability — having a hungry mind and being a fast and passionate learner — is more important than having acquired a certain expertise in college'. Tomas Chamorro-Premuzic(2020) also points that the value of a degree in a market, just like any other good, is measured by its supply-Just like the value of a master's degree is equivalent to the value of an undergraduate degree 30 years ago, if in 30 years a large proportion of the workforce obtains a master's, or Ph.D., employers may finally be forced to look at talent and potential beyond formal qualifications.

A basic order of business while deciding whether to attend Grad school is to weigh the financial returns of a master's degree over an undergraduate one. The statistics presented by Rebecca Radclife(2014) concluded that people with master's qualifications are more likely to find work than those with undergraduate degrees – and they're likely to earn a slightly higher wage. The numbers that supported the above statement go as follows

A) "the uplift is about £2-3k to start with, so first-degree graduates might be on around £17-22k six months after finishing their course, with master's grads on slightly more."

B)Of those graduating in 2011-12, data from the Higher Education Statistics Agency (Hesa) shows 86.6% of postgraduates were working in professional positions six months after graduating, compared with 64% of first-degree graduates.

Apart from the alluring figures in favour of a master's degree, Rebecca Radclife(2014) also covers areas in which a master's degree may not add anything to the employability chances of a student. A master's degree in a generic course as opposed to technical ones - medicine, pharma, etc, will not be of much use and employers will view you in the same way as a job aspirant with one less degree.

The economic cost of a Ph.D.

"Why doing a Ph.D. is often a waste of time" (2010 Christmas double issue, The Economist) tries to analyze and critique the need for a doctorate in academic as well as industrial professions. The article also makes a stark comparison between employment conditions and contracts of Ph.D. scholars and Ph.D. students and contract staff known as "postdocs". Citing the findings of Dr. Freeman, the paper concludes that pre-2000 data shows, American faculty jobs in the life sciences were increasing at 5% a year, just 20% of students would land one. 'In Canada, 80% of postdocs earn $38,600 or less per year before tax — the average salary of a construction worker.' The rise of the postdoc has created another obstacle on the way to an academic post.

While landing a job in academics is a difficult enough task for doctorates, the corporate sector complains about shortages of high-level skills, suggesting PhDs don't furnish practical skills that can contribute to good placements. The fiercest critics compare research doctorates to Ponzi or pyramid schemes. 'The organizations that pay for research have realized that many PhDs find it tough to transfer their skills into the job market. Writing lab reports, giving academic presentations, and conducting six-month literature reviews can be surprisingly unhelpful in a world where technical knowledge is in-demand.' The data doesn't tell a very different truth either, America produced more than 100,000 doctoral degrees between 2005 and 2009. In the same period, there were just 16,000 new professorships (Higher Education? How Colleges Are Wasting Our Money and Failing Our Kids-and What We Can Do About It, Andrew Hacker and Claudia Dreifus, 3rd August 2010). The research also gives evidence in support of how the value of a Ph.D. is contingent on socio-political developments of a country, 'The post-Sputnik era drove the rapid growth in Ph.D. physicists that came to an abrupt.

halt as the Vietnam war drained the science budget. Brian Schwartz, a professor of physics at the City University of New York, says that in the 1970s as many as 5,000 physicists had to find jobs in other areas.' Some statistical findings of the study by Bernard H. Casey (2009) that was later published in the journal of Higher Education Policy and Management, highlight the difference in wellbeing in monetary terms between that of undergraduates, graduates, doctorates, and those who never made it to college. British men with a bachelor's degree earn 14% more than those who could have gone to university but chose not to. The earnings premium for a Ph.D. is 26%. But the premium for a master's degree, which can be accomplished in as little as one year, is almost as high, at 23%. In some subjects, the premium for a Ph.D. vanishes entirely. Contrary to what was reiterated in the previously reviewed papers, (Casey, 2009) writes that the premium for a Ph.D. is actually smaller than for a master's degree in engineering and technology, architecture, and education. It considers the arguments that the gains accrued to the society as a whole from the research undertaken and the output produced by the scholars supersedes the personal gain to the individual Ph.D. holder. Social benefits, galore, and reimbursement for service, scarce.

The Question of Affiliation

This pioneering article (Dr. KJS Anand, 2017) takes the reader through a point-wise comparison between government and private colleges on the basis of - tuition fees, infrastructure, faculty, and placements. (Dr. KJS Anand,2017) divides colleges into 3 categories namely, government institutions, private colleges, and Government-affiliated private colleges. The writer states that government colleges despite low fees and excellent faculty, lag behind in infrastructure development and placement prospects. The private colleges, on the other hand, tend to have higher fees but a motivated faculty, great infrastructure and provide students with every possible help during placements. Coming to, Government-affiliated private colleges, they are not entirely private and are affiliated with Government/public universities and offer the best of both worlds. ` While the degree they offer is backed by the Government, they are free to implement most of its policies and procedures like private colleges. They have the operational costs that are covered by students through fees and hence, they offer the same advantages that many private colleges offer. They provide good infrastructure, access to all possible resources required for professional training, innovative pedagogy, and the best possible help during placements. The students are provided with full support and guidance, which help in their holistic growth.'Hence, there is no one winner or loser based on all the above criteria. Placements alone, be that as it may, may, or may not tell otherwise.

Sources of data collection

The following is the list of colleges/ universities from which the data for this research paper has been collected.

1.SRCC
2.IIT Bombay
3.St. Stephens
4.Shiv Nadar University
5.Symbiosis
6.G.D. Goenka University
7. Delhi School Of Economics
8. IGIDR, Bombay
9. NMIMS University
10.St. Xaviers
11.Shaheed Sukhdev College
12.JNU
13.FMS
14.ISI, Kolkata
15.IIM Ahmedabad

The Econometrics Model

$$\ln(plac) = b_1 + b_2 D_{2i} + b_3 D_{3i} + b_4 \ln(recr)$$

$$\ln(plac) = b_1 + b_2.college + b_3.edu + b_4 \ln(recr)$$

Where the dependent variable is log of number of placements and,

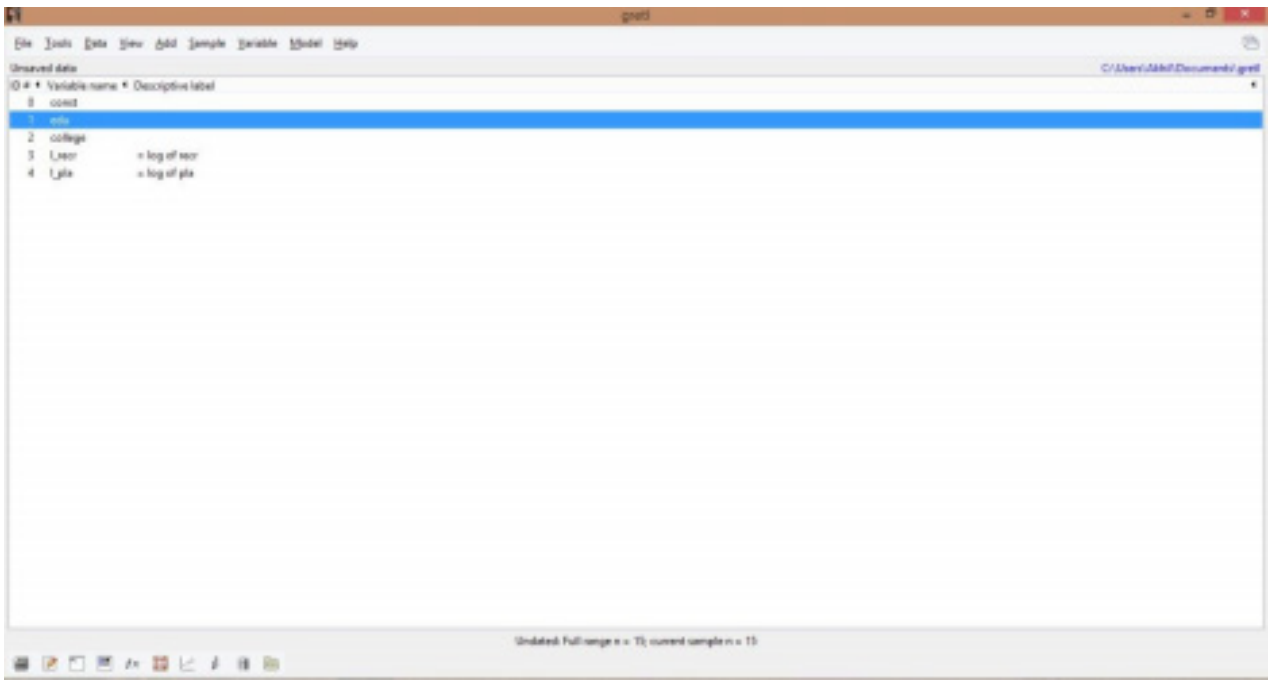
The independent variables- 1) affiliation of college
2) level of education
3) log of number of recruiters

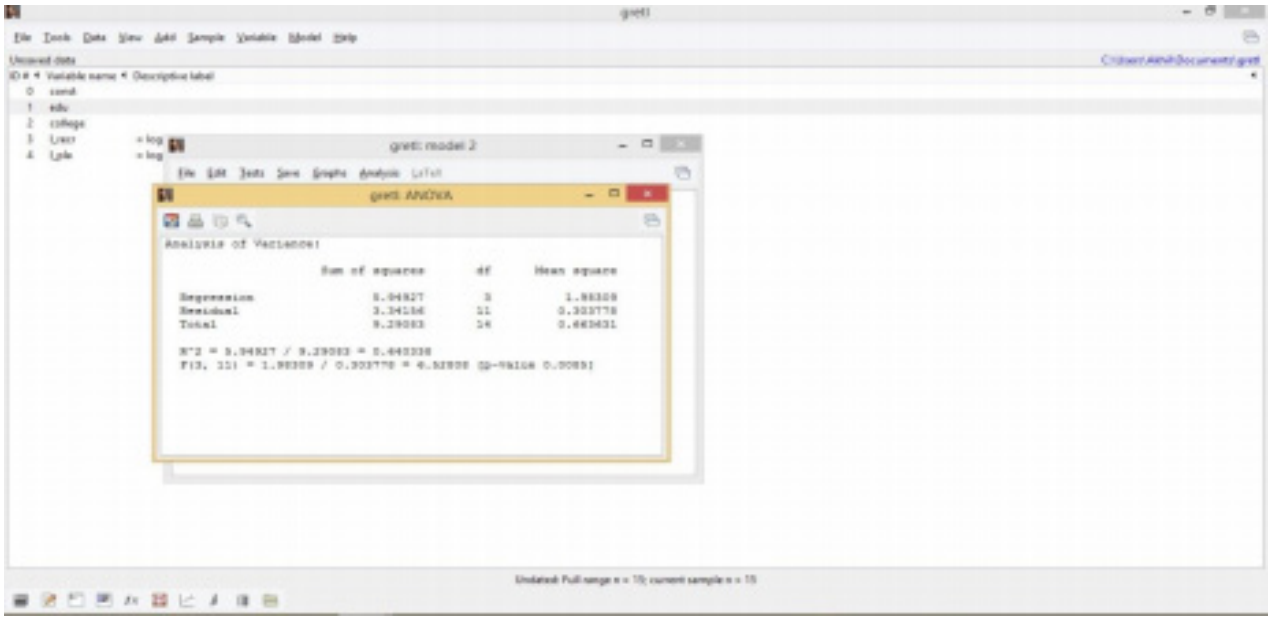
D_{2i} and D_{3i} dummy variables,

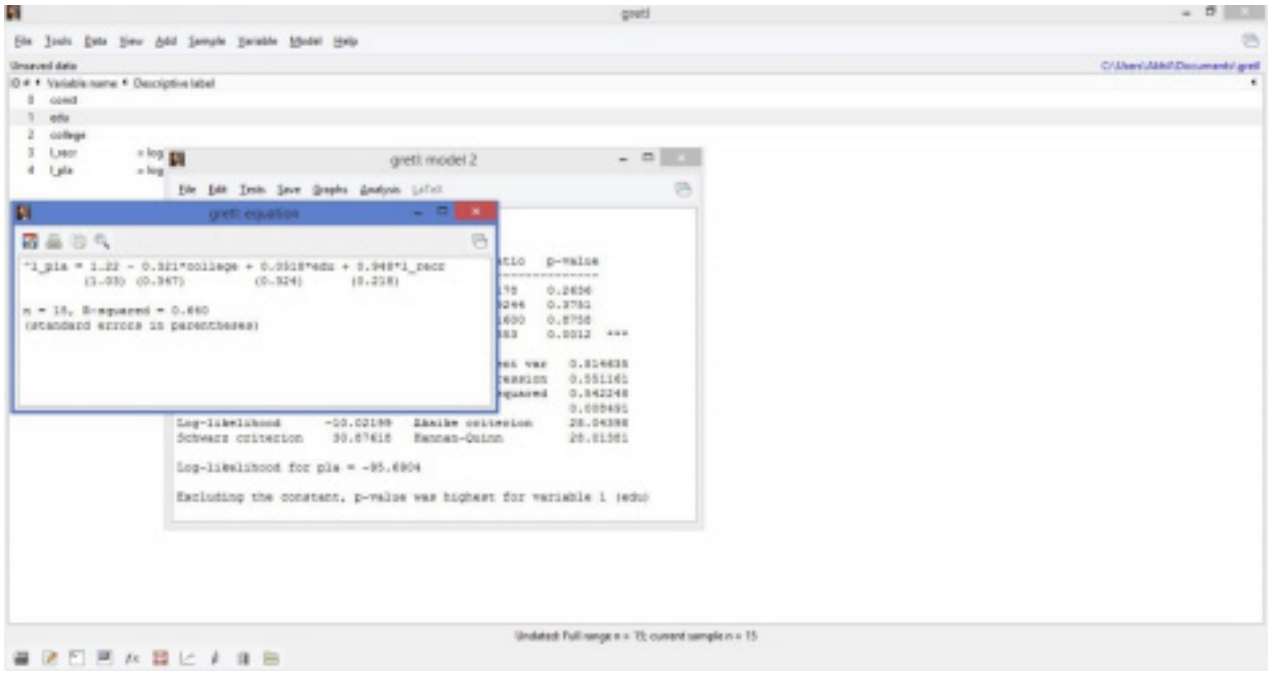
D_{2i}= { 1, if government college
0, otherwise }

D_{3i}= { 1, if postgraduate
0, otherwise }

Working of the Model







Resultant Econometrics Model

log(plac)= 1.22-0.321(college) + 0.0518(edu.) + 0.948 log(recr.)

Interpretations and Relations

1. Here, b1=1.22 is the intercept coefficient which represents the average of log(placements) when the college is non-government, the level of education is other than post-graduation and the log(recruiters) is kept as zero.

2. Here, b2= -0.321, represents that if it is a government college, the average of log(placements) falls by 0.321 units, keeping other factors constant. The negative sign states that there is an inverse relationship between government colleges and campus placements.

3. Here, b3=0.0518, represents that when one postgraduate student is placed, the average of log(placements) increases by 0.0518 units, keeping other factors constant. The positive sign indicates a direct relationship between higher education and campus placements.

4. Here, b4=0.948 represents that when the number of recruiters increases by 1%, the average log(placements) increases by 0.948%, keeping other factors constant.

Hypothesis Testing

We have assumed a 5% level of significance.

1. H0: B2=0 i.e., there is no significant difference in average campus placement of government and private colleges

HA: B2≠0

t(b2)= b2-B2/ s.e.(b2) ~ tn-4

=-0.320880-0/0.347117 ~t11

=-0.9244

ttab=2.201

ttab>|tcal|

Therefore, we do not reject the null hypothesis of B2=0 at 5% level of significance with 11 degrees of freedom.

2. H0:B3=0

HA:B3 ≠0

t(b3)=b3-B3/s.e.(b3)~tn-4=11

=0.0517752/0.323

=0.1600

ttab=2.201> tcal

Therefore, we do not reject the null hypothesis of B3=0 at a 5% level of significance with 11 degrees of freedom.

3. H0: B4=0

HA:B4 ≠0

t(b4)= b4-B4/s.e.(b4)~tn-4=11

=0.947668/0.217715

=4.353

ttab=2.201

ttab< tcal

Therefore, we reject the null hypothesis of B4=0 at 5% level of significance with 11 degrees of freedom.

Results

1.The data collected is limited and restricted to colleges situated in certain parts of the country and hence, the results are not generally applicable. 2.The model relies on data released by college placement cells and the university's in-house media houses, the credibility of which can run into question. 3.Due to the lack of secondary data on the topic, the randomization between government and private colleges in data collection is limited.

4. The data/model does not take into account the difference of courses among the various colleges and universities and the conditions of the job market at any given point in time.

Limitations and Drawbacks

1.The data collected is limited and restricted to colleges situated in certain parts of the country and hence, the results are not generally applicable.

2.The model relies on data released by college placement cells and the university's in-house media houses, the credibility of which can run into question.

3.Due to the lack of secondary data on the topic, the randomization between government and private colleges in data collection is limited.

4. The data/model does not take into account the difference of courses among the various colleges and universities and the conditions of the job market at any given point in time.

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The Determinants Of Juvenile Crime In India

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Abstract

This paper empirically analyses the role of various factors in determining the juvenile crime rate by undertaking a cross-sectional study of the 29 Indian states (as in 2016) and Delhi. The focus of this paper is on examining the impact of malnutrition, parental absence and schooling on the development of criminal tendencies among juveniles. After controlling for all the other relevant factors by including adult crime rate in the model, it was found that malnutrition and parental absence have positive, statistically significant relationships with juvenile crime. School attendance ratio has a negative relationship; however, it was statistically insignificant. The association between state per capita income and juvenile crime has also been discussed.

Keywords: Juvenile Crime, Malnutrition, Parental Absence, Schooling
JEL Classifications: I1, I2, K1

Introduction

Addressing the subject of juvenile crime1is important not only because it is desirable to keep young people out of crime but also because it provides a vital opportunity. An opportunity to identify antisocial tendencies in the initial stage of their development and avert aggravation through appropriate corrective action. Figuratively speaking, to nip them in the very bud. This thinking is reflected in the terminology used by law enforcement agencies worldwide to describe juvenile convicts- phrases such as "juvenile delinquents" and "children in conflict with law" in place of "criminals". Opining on whether or not should children and adolescents be treated in the same way as adults in the eyes of the law is not the purpose of this study. It instead aims to understand the origins of criminal behaviour in young people.

The relationship between per capita income and crime rate is not absolute. Unlike various indicators of health and education, crime rates do not necessarily improve with economic progress (Drèze and Khera 2000). The same reasoning can be extended to the case of juvenile crime. Moreover, it would be imprudent to base corrective policies on "common beliefs". Such an exercise may well prove to be futile, if not counterproductive. Thus, an investigation of the determinants of juvenile crime is in order. Researchers have identified several risk factors associated with the development of delinquency. Family, nutrition and education form an important trinity of determinants. In the context of India, this study attempts to explore these linkages using state-level data. The role of income is also examined.

Juvenile Crime in India: An Overview

The National Crime Records Bureau publishes an annual compendium of statistics titled Crime in India. In the year 20162, 33,697 cases were registered against juveniles under the Indian Penal Code (IPC) across India. Among all juvenile crime heads under the IPC, most cases were reported under "Theft" (22.9 per cent of total cases) and "Criminal trespass/Burglary" (8.1 per cent). "Rape" and "Murder" accounted for 5.1 and 2.4 per cent of the cases respectively. Among the states, Madhya Pradesh recorded the highest number of cases while Manipur the least. Delhi accounted for 7.2 per cent of the cases and had the highest juvenile crime rate in the country. Of all juveniles apprehended under the IPC, 73.7 per cent belonged to the age bracket of 16-18 years3.

Review of Literature

Existing literature on juvenile crime is diverse not only in terms of perspective (neuroscience, psychology, public policy) but also methodology (controlled trials, criminal profiling, cohort studies). Studies reveal the existence of several risk factors that are responsible for the emergence of criminal tendencies in juveniles. It is important to note that these linkages are not automatic. Not all children exposed to such risks commit crime while some without a similar history still engage in such behaviour. Persistence and severity of exposure increase the likelihood of crime. Moreover, multiple risk and protective factors interact to produce complex conditions making individual analysis highly context-specific.

Malnutrition in early childhood is related to aggressive and antisocial behaviour in adolescence. Studies have shown that repeat offenders with a criminal history dating back to adolescence display heightened impulsivity, temperamental disorders and structural brain abnormalities. Gesch (2013) conducted a double-blind study on young adult prisoners (18-21 years) to explore the relationship between nutrition and violent behaviour. Those who had received real nutritional supplements for at least 2 weeks committed 37 per cent less violent offences in detention compared to the placebo group. The results were highly statistically significant.

The role of the family in the lives of juvenile delinquents has been studied extensively. While affection and involvement reduce delinquency, parental rejection increases its likelihood. Parental supervision is a key variable in predicting delinquency (Wright and Wright 1994). Episodes of familial conflicts are also similarly linked. The relationship with schooling is often overly-simplified. While dropping out of school and poor academic performance are connected with juvenile delinquency, the "in-school" experience is an equally significant determinant (Institute of Medicine, 2000). Peer-groups, grading and punishment policies exert considerable influence on the development of such tendencies. The propensity to commit crime is also related to exposure and experience of abuse. Abused youth are likely to be more violent and persistent offenders (Criminal Justice 2020).

Dutta, Jana and Kar (2017) found per capita income to be positively linked with juvenile crime rates across Indian states. This stems out primarily from the connection between the incidence of property crimes (such as theft and burglary) and the income of a region. As income rises, the opportunity and return from such crimes also rise4.

Conceptual Framework

Variables affecting juvenile crime can be classified into two categories. The first category contains all those variables that impact crime in general such as population density, effectiveness of law enforcement, presence of organised crime. Some of these variables may be hard to quantify. In India's context, gender and caste inequality have also been found to be important determinants of crime (Drèze and Khera 2000). It is desirable to control for these variables in the model.

The second category consists of variables that are specific to juvenile crime. A trinity of such specific factors has been identified- education, family and malnutrition. High prevalence of malnutrition should be linked positively with juvenile crime. A similar relationship is expected with parental absence. School attendance ratios should discourage crime and thus a negative relationship is expected.

Dutta, Jana and Kar (2017) claim that income has a positive relationship with juvenile crime in India because the bulk of the cases reported under juvenile crime fall under the category of property crime. "Theft" and "criminal trespass/burglary" were indeed the top two IPC crimes committed by juveniles in 2016 (National Crime Records Bureau 2017). This trend has remained consistent over the years. For the purpose of this study, property crime has been defined as the sum total of crimes reported under the crime heads "theft", "criminal trespass/burglary" and "robbery". It can be seen from figure 1 that the state juvenile property crime rate has a positive elasticity with respect to state per capita income5. Figure 2 shows that the component share of property crime in the total juvenile crime rate of the state also increases with rising state per capita income. Thus, one can expect juvenile crime in India to be positively linked with per capita income.

Figure 1: Annual Juvenile Property Crime Rate and State Per Capita Income 2015-17 for 29 states and NCT of Delhi

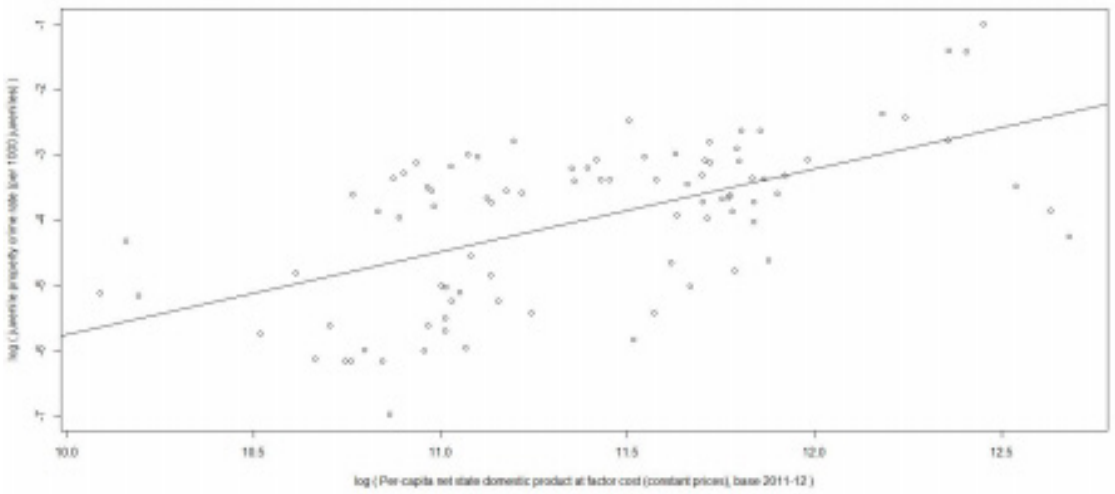
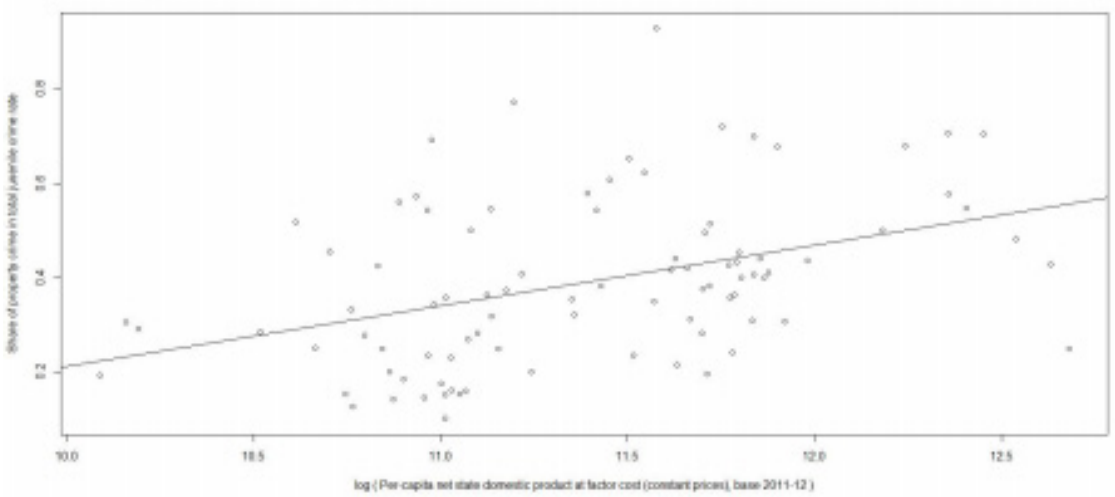


Figure 2: Annual Share of Property Crime in Juvenile Crime Rate and State Per Capita Income 2015-17 for 29 states and NCT of Delhi



Source: Crime Statistics: Crime in India 2015, 2016 & 2017. State per capita income: Reserve Bank of India

Adult crime rate is a good indicator of the prevalence of crime and the effectiveness of law enforcement in a region. It can be used as a proxy for the "generic-to-crime" variables. Generic variables are expected to influence the juvenile crime rate in the same way as the adult crime rate. By including adult crime rate in the analysis, such variables can be effectively controlled while saving degrees of freedom. A positive coefficient of adult crime rate should confirm the belief. Moreover, adult crime rate in itself can be a causal factor. As noted before, exposure to crime can motivate juveniles into crime.

Data and Methodology

This is a cross-sectional study of the 29 Indian states (including the erstwhile state of Jammu and Kashmir) and the National Capital Territory of Delhi for the year 2016. The time period has been chosen keeping in mind the availability of the National Family Health Survey (NFHS) data. Moreover, the new Juvenile Justice (Care and Protection of Children) Act, 2015 came into force on 15 January 2016. Data sources and descriptions can be found in Table 1. Summary statistics of the variables can be found in Appendix A.1.

Table 1. Data Description

Variable	Description	Time Period	Source
JCR	Juvenile Crime Rate, number of IPC crimes committed by juveniles (below 18 years of age) per 1 lakh juvenile population	2016	Crime aggregates from Crime in India 2016, National Crime Records Bureau Population estimates from the Report of the Technical Group on Population Projections, Union Ministry of Health and Family Welfare, July 2020
ACR	Adult Crime Rate, number of IPC crimes committ	2016	
INCOME	Per-capita net state domestic product at factor cost (constant prices), base 2011-12	2016-17	Handbook of Statistics on Indian States (online), Reserve Bank of India

ATTENDANCE	Percentage of household population 6-17 years attending school	2015-16 (Survey period January 2015 to December 2016)	National Family Health Survey 4
INDEPENDENT	Percentage of children under age 18 not living with a biological parent		
	Percentage of children under age five years with weight-for-height ratio below -3 standard deviations (SD) from the International Reference Population median. This criterion is used by the World Health Organisation to identify children with severe acute malnutrition	2005-06 (Survey Period November 2005 to August 2006)	National Family Health Survey 3

IPC crimes committed by adults = Total IPC crimes – IPC crimes committed by juveniles
bIt should be noted that the data corresponding to the variable MALNUTRITION is from the period 2005-06 and not 2015-16. The rationale behind using a lagged variable is as follows. National Family Health Survey 4 provides malnutrition rates for children aged under five years in 2015-16. However, as per the NCRB data 98 per cent of the juveniles apprehended under the IPC in 2016 were aged 12 or above. Therefore, in order to establish a relationship between malnutrition in early childhood and crime in adolescence, we must look at the prevalence of malnutrition ten years before. This data is provided by NFHS 3 (2005-06).

Since the state of Telangana was formed in the year 2014, data for old Andhra Pradesh, assuming it was representative of the entire region, has been used for both Telangana and new Andhra Pradesh.

World Health Organisation. "Management of severe acute malnutrition in infants and children." Accessed December 30, 2020.

https://www.who.int/elena/titles/full_recommendations/sam_management/en/

Previous studies suggest taking the natural log transformation of crime rate because its distribution is usually positively skewed. The data on juvenile crime rate displays the same property. This transformation allows us to "normalise" it. Moreover, a log transformation of the dependent variable (in this case, juvenile crime rates) ensures that the predicted values are non-negative.

Using the method of Ordinary Least Squares (OLS), the parameters of the following equation were estimated.

$$\log(\text{JCR})_i = \beta_1 + \beta_2 \log(\text{ACR})_i + \beta_3 \log(\text{INCOME})_i + \beta_4 \text{ATTENDANCE}_i + \beta_5 \text{INDEPENDENT}_i + \beta_6 \text{MALNUTRITION}_i + u_i \quad \ldots (1)$$

Regression Results

Results of the OLS regressions can be found in Table 2. Results of the diagnostic tests for multicollinearity, heteroscedasticity, model misspecification and normality of residuals can be found in Appendix A.2.

Table 2. OLS Regression Results | Dependent Variable: log(JCR)

Independent Variables	Coefficients	
	(1)	(2)
INTERCEPT	−12.1399 (0.0008)***	−12.9269 (0.0002)***
log(ACR)	1.1479 (0.0003)***	1.1887 (0.0001)***
log(INCOME)	0.7397 (0.0320)**	0.5983 (0.0244)**
ATTENDANCE	−0.0245 (0.4963)	-

INDEPENDENT	0.1590 (0.0190)**	0.1563 (0.0192)**
MALNUTRITION	0.0718 (0.0693)*	0.0736 (0.0594)*
R-squared Adjusted R-squared	0.6004 0.5171	0.5924 0.5272
F statistic	F(5, 24) 7.2123 (0.0003)***	F(4, 25) 9.0861 (0.0001)***
Number of observations	30	30
p-values in parentheses		
Significance codes: 0.01 ***, 0.05 **, 0.10 *		
Source: Author's calculations		

Discussion of Results

All the coefficients in Model 1 have the expected signs. The coefficients are also jointly significant. Parental absence, as measured by the variable INDEPENDENT, has a positive relationship with juvenile crime. The coefficient is statistically significant. The family acts as a safety net for children. In its absence, children are left to fend for themselves both financially and emotionally. They are more likely to make regrettable choices with no one to bail them out of the consequences. The coefficient of MALNUTRITION is positive and statistically significant at ten per cent. Malnutrition reduces a person's physical and cognitive capabilities

making them more prone to commit crime. School attendance is negatively linked with juvenile crime however the relationship is not statistically significant. This reinforces the notion that attendance alone cannot prevent crime among juveniles. Their experiences in school, with teachers, peers and the process of learning itself, are equally important determinants.

The elasticity of juvenile crime with respect to per capita income is positive. This is in line with the results of the studies conducted in the past. As discussed before, states with higher per capita incomes experience more juvenile property crimes. In more affluent neighbourhoods, the incentive to commit such crimes is greater. Property crimes have the highest share in the juvenile crime rate.

The coefficient of adult crime rate is positive and highly statistically significant. It however cannot be seen in isolation. It has been used as a proxy for all "generic-to-crime" variables that may not be observed individually. Thus, it can be inferred that those variables affect adult and juvenile crime rates similarly. The R-squared value is considerably high for a cross-sectional study of this nature. Even after dropping ATTENDANCE from the original model, all the remaining coefficients retain their signs and remain significant at the same levels.

Based on the results of the diagnostic tests (see Appendix A.2), it can be concluded that the model is adequately specified and does not suffer from multicollinearity or heteroscedasticity. One would generally expect the presence of heteroscedasticity in a cross-sectional study with such diverse units. It appears that the inclusion of adult crime rate in the model has effectively provided for any state-specific heterogeneity. Given the small sample size, a test for normality of residuals was conducted. It can be concluded that the residuals are normally distributed.

Conclusion

The risk factors associated with the development of delinquency can serve as important predictors of behaviour. The results provide important insights for policy formulation. Juveniles living independently are indeed a vulnerable group. In this context, foster care can prove to be a possible solution. Nutrition can play a significant role in corrective programmes. As past research shows, nutritional supplements can help reduce violent behaviour in young inmates. With regards to education, experts suggest developing alternatives to grade retention and improving learning outcomes. They also recommend against isolating aggressive youngsters or grouping them (Institute of Medicine 2001). Evidence suggests that by assimilating them into prosocial groups, their antisocial tendencies can be subdued.

Appendix

A.1 Summary statistics of the variables

Variable	Mean	Standard Deviation	Minimum	Maximum
JCR	8.43	8.87	0.63	44.27
ACR	346.24	287.80	102.58	1576.10
INCOME	103590.00	62400.00	25820.00	305880.00
ATTENDANCE	88.19	4.77	79.100	97.40
INDEPENDANT	3.93	2.26	1.500	11.30
MALNUTRITION	6.16	3.55	2.100	19.90
Number of observations: 30				
Source: Author's Calculations				

A.2 Diagnostic Tests for Model 1

Regression Diagnostic	Test	Result	
Multicollinearity	Variance Inflation Factors	log(ACR)	1.424
		log(INCOME)	1.992
		ATTENDANCE	1.758
		INDEPENDENT	1.247
		MALNUTRITION	1.099
Heteroscedasticity	Breusch-Pagan Test	p-value = 0.983	
	Abridged White's Test (squared residuals regressed on fitted values and squared fitted values)	F(2, 27) 0.190 p-value = 0.827	
Model Specification	Ramsey's RESET	p-value = 0.340	
Normality of Residuals	Jarque-Bera Test	p-value = 0.763	
Source: Author's calculations			

A.3 Correlation matrix of the regressors

Log(INCOME)	MALNUTRITION	ATTENDANCE	INDEPENDENT	Log(ACR)	
1.000	-0.271	0.618	-0.089	0.320	Log(INCOME)
	1.000	-0.231	-0.085	-0.051	MALNUTRITION
		1.000	0.081	0.000	ATTENDANCE
			1.000	-0.428	INDEPENDENT
				1.000	Log(ACR)

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NAVDHAARNA RESEARCH PAPERS

Navdhaarna is Arthashastra's paper presentation competition which seeks to provide a platform for undergraduate researchers to put forward their most innovative ideas with the best of their arguments. The shortlisted teams get to present their work in front of an esteemed panel and answer the questions posed to them.

The following research papers got shortlisted to the final round of the competition this year. We loved reading them and hope you do too!

COVID-19, Child Labour Incidence and Policy Responses: A Dynamic Trade Theoretic Analysis.

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Abstract

The present paper attempts to offer an analytical structure towards an understanding of the effects of COVID-19 pandemic on schooling, education and the incidence of child labour. The paper explores the social cost of the global outbreak and its consequences on various sectors. In doing so, we extend the Three-sector General Equilibrium model to incorporate the dynamics of a trade theoretic economy and derive a child's optimal time allocation in schooling and unskilled wage earning in the labour market from household's optimization of an intertemporal utility function. Three different cases pertaining to time allocation are obtained which crucially hinges on the level of education subsidy provided by the government. Our study considering the impact of the global outbreak has found that a fall in training cum recruitment cost in the skilled sector or an increase in education subsidy can lower the incidence of child labour.

JEL classification: I24, D5, C15, J78, J43, J46
Keywords: Child Labour, COVID-19 Pandemic, Public policy, Education.

Introduction and Motivation

The multifarious impact of COVID-19 has been observed in every sector around the world. We have witnessed a lot of shifts in different trends and the pandemic has also made us realize that changes are inevitable in nature.

The education and schooling sector has been hugely wedged by the pandemic, its insinuations and the reverberations. The outbreak of the virus has affected approximately 120 crore students across the world and around 32 crore students in India. Due to various restrictions like travelling and measures limiting community spread, the educational intuitions had been compelled to cancel normal classes and conduct classes through the online mode of communication.

Apart from education, the labour force has also been affected in innumerable ways. The detrimental effects of the pandemic were not distributed equally. They have mostly damaged the poor nations which were already in vulnerable conditions. Although in the last two decade there has been a noteworthy stride in the fight against child labour, the COVID-19 pandemic poses a real risk of backpedalling.

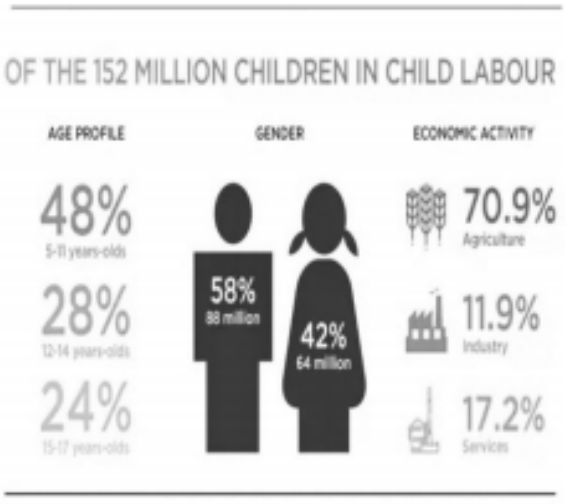

Figure 1, gives us a brief idea about the involvement of children in the labour force with respect to their age, gender and the sector in which they are involved. The COVID-19 pandemic has resulted in an economic downturn as a result of which positive trend may weaken and child

labour may worsen especially in developing countries. The pandemic has increased economic insecurity and many people lost their job due to disruption in the supply chain as a result of which the manufacturing

sector got halted. In India alone, COVID-19 is said to have left 120 million without employment as of May 2020.

The economic contraction due to COVID-19 has reduced opportunities in the labour market mainly for the people in the marginalized sector like migrant labourers. As a result of this parents from these marginalized societies are forced to push children into hazardous and exploitive work so they can contribute to household incomes.

Table 1: Children engaged in child labour across the world

Region	Number of Child Labourers (million)	Regional Prevalence of Child Labour (%)
Africa	72.1	19.6
Asia and the Pacific	62.1	7.4
Americas	10.7	5.3
Arab States	1.2	2.9
Europe and Central Asia	5.5	4.1

Source - ILO

From the table, we can see there are around 152 million children engaged in child labour, where the highest value of child labour engagement can be seen in the African regions and least value of child labour is evident in European and Central Asian regions. Most of the child labour engagement can be found in the agricultural sector or in a hazardous sector such as mining and construction.

In India, we can observe from the census data of 2011, that 10.1 million children are engaged in child labour. Uttar Pradesh, Bihar, Rajasthan, Maharashtra, and Madhya Pradesh witness relatively higher number of cases regarding child labour.

The root cause of child labour is poverty and lack of access to decent working prospects. On top of these factors, social marginalization and lack of formal as well as vocational education often force underaged minors to work in unwanted conditions where they are mostly exploited. According to the World Bank,

there is a chance of 12 million people slipping below the poverty line due to pandemic related job loss. Now, various researches have shown that poverty is co related to child labour, it has indicated that a certain point percentage change in poverty can cause an increase in child labour around 0.7%. The return of migrant labourer in their respective village communities has also led to deterioration in the labour force supply in the cities, mainly the sectors such as agriculture, construction which heavily rely on migrant labourers are the worst affected. The parents from marginalized sections are forced to send their children to be employed in the workforce which can result in exploitation, In such cases the employer can hire them at a less cost as children's have less bargaining powers and are unable to press for their rights.

A study by the International Labour Organization shows that the children who are not a part of the education system have been more vulnerable to this threat. The International Labour Organization has also formulated a special policy framework as a responsive measure for the pandemic. The policy comes with an objective to primarily stimulate economy and employment, support enterprises, jobs and income. Protection of workers in workplace is the key measure and it also aims to rely on social dialogues for solutions.

UNICEF's agenda to tackle the pandemic and is also praiseworthy. Some of its aims are to keep children well nourished, reach out to vulnerable children with basic amenities, stimulate the learning process of children, providing provisions to families in order fulfil their needs and take care of minors, protect them from violence and most importantly, protect refugee as well as migrant children and the ones affected by the consequences of the global outbreak.

We investigate the data collected from World Bank, ILO and various other sources to identify the relation between Poverty rate and Child Labour across various countries. It helps us to establish the background for our research by incorporating the idea of "Poverty Hypothesis" in our research paper.

The method involves, representation of the latest data for Poverty rate and Child Labour for 18 different countries in form of a X, Y Scatter Graph.

Table 1 describes the percentage of child labour and poverty for different low and middle income countries obtained from the World Bank data, ILO and few other sources. Using the data in table 1 we obtain the average rate of child labour and poverty to be 19.9 per cent and 34.2 per cent respectively.

The following matrix is intended to show the cross-sectional variation of child labour and poverty for the countries listed in table 1.

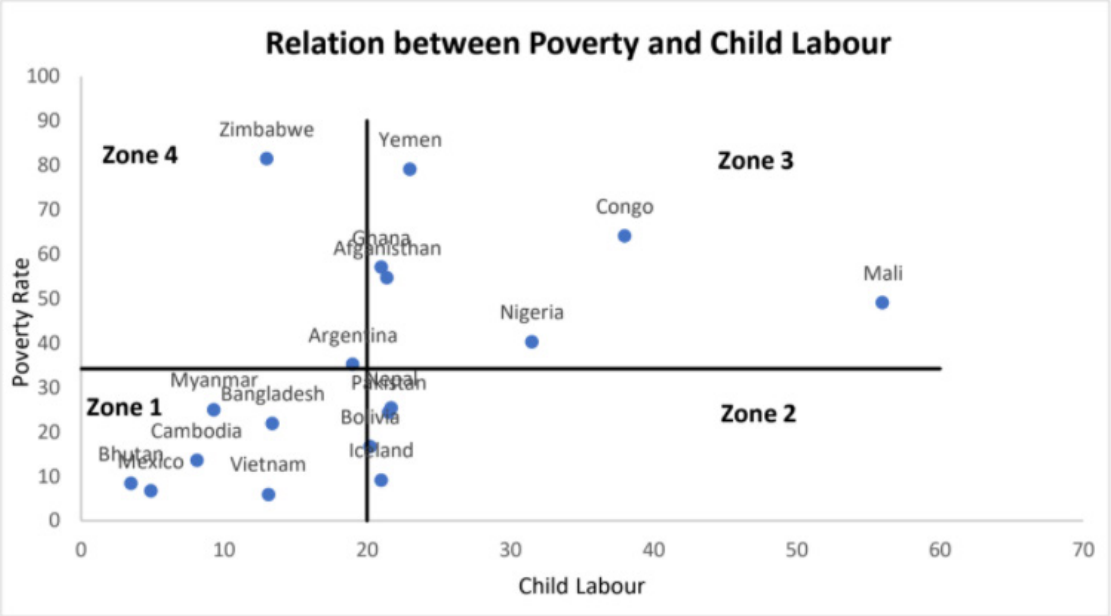

Figure 3 *- Source: Self computation using data from World Bank, ILO and various other sources*

In Fig. (3), along the horizontal axis percentage share of child labour is measured while along the vertical axis poverty rate is measured. The solid vertical line originating from the horizontal axis shows the average share of percentage of child labour and the solid horizontal line originating from the vertical axis shows the average rate of poverty. These average level divides the box into four different zones. The fours different zones, zone 1-zone 4 represents the zone with (lower child labour, lower poverty), (higher child labour, lower poverty), (higher child labour, higher poverty) and (lower child labour, higher poverty), respectively. Zone 1 and Zone 3 follows Poverty hypothesis i.e. child labour varies positively with poverty rate while Zone 2 and Zone 4 violates the poverty hypothesis. From Fig. (1) we observe that most countries are concentrated either in Zone 1 or Zone 3 with an exception of Zimbabwe in Zone 4 and Iceland and Bolivia in Zone 2. The concentration of most countries in zone 1 and zone 3 clearly validates the poverty hypothesis for cross-sectional variation among middle- and low income countries.

Review of Literature

Poverty as the primary cause behind the emergence of the problem of working children from poor and unskilled households was explored in the seminal work by Basu and Van (1998). Basu, Das and Dutta (2009) had shown labour market imperfection as an additional source behind the emergence of the incidence of child labour. Other relevant literature which found poverty hypothesis or wealth effect as cause behind child labour includes Basu (1999), Ray (2000), Basu and Tzannatos (2003), Emerson & Souza (2003), Krueger (1996), Edmonds and Pavenik (2005) etc. among many others. Dwibedi and Marjit (2017) explained the wealth paradox and provided a theoretical exposure based on two axioms of "inequality lowers welfare" and "inequality improves relative-status" which affects child labour supply decision. Dwibedi and Chaudhuri (2014) had analysed the failure of price subsidy policy to the backward agriculture that fails to lower the incidence of child labour. Jafarey and Lahiri (2002) obtained that credit (borrowing) constraint hinders the way of trade sanction to curb the incidence of child labour. If borrowing constraint is relaxed then trade sanctions may produce favourable outcomes.

Derivation of Child Labour Supply Function

In this model we attempt to provide a multi-sectoral dynamic trade-theoretical model to analyse the effect of COVID-19 policy responses on the incidence of child labour, school dropout rate and skill acquisition. Further, we also propose some alternative policy measure which could reduce the incidence of child labour and increase the rate of schooling. In so doing, we first derive endogenously the optimal time allocation of child's time in schooling and in labour market activities. This is an intertemporal decision-making problem where a poor unskilled family faces a trade-off in terms of present gain from engaging the child in unskilled labour intensive work which increases family's present level of consumption, and present discounted value of future skilled earning from schooling which increases future period consumption level. The family while optimally choosing the time allocation for the child takes market unskilled adult wage rate, child wage rate and skilled wage rate as datum which are determined from the competitive general equilibrium system.

The stylized economy consists of three sectors. In the first hand we have the agriculture sector which uses unskilled informal adult labour and child labour who are employed at wage rate W and W_c. Secondly, we have the high skilled export sector uses skilled labour who are employed at wage rate W_s and capital k. Finally, we have the manufacturing sector which is an import competing sector employs unskilled formal labour at wage rate $\bar{W}$ which is institutionally fixed and also uses capital k. Capital earns homogenous return 'r' across sectors. Unemployment of skilled labour exists in formal manufacturing sector; however, no open unemployment exists.

We have divided one day's time into two equal halves each halve consisting of twelve hours. Thus, time dynamic in our model is not only limited to two discrete period analysis but also two-time period in each day. Skilled sector exploits this time zone difference to function and produce output for entire hours in each day by outsourcing its services during night hours. This outsourcing encounters a fixed technological cost.

In this two-period optimization framework the representative households are altruistic decision makers. Let there are 'n' number of homogenous households. Each household maximizes their utility which is a function of consumption in two periods and is represented by

$$U = logC_t + \beta logC_{t+1} \qquad (1)$$

In period 1 the household consumption is denoted by Ct. Let if lc be the time allocation of the child in school or work. If b is the amount which the child is losing for engagement in schooling by not going to work and s is the subsidy on the education. Given that income is entirely exhausted in consumption, thus, in period 1 consumption is given by

$$C_t = (W + l_c W_c) - bl_c + sl_c \quad (2)$$

The first period income consists of income from unskilled work(W + lcWc) , income from subsidy provided for education (slc) net of cost of education (blc). 2 The direct cost of education is b and the rate of subsidy is s.

In period 2, the consumption is given by

$$C_{t+1} = [l_c W + (1 - l_C)\, W_s] \qquad (3)$$

In the second period, the child acquires skill for the time spent in schooling in period 1 and earns higher skilled wage in period 2 (1 – lC) Ws. However, for the time which was spent in doing unskilled work in period 1 earns the same unskilled wage rate in period 2. Finally, we normalize the total time of the child to unity. Thus, the time distribution is given by

$$l_c^u + l_c^s = 1 \qquad (4)$$

Households maximize their utility (eq. 1) subject to the constraints in (eq. 2, eq. 3 and eq. 4).
The household's problem can be stated as

$$Max\ U = logC_t + log\ C_{t+1}$$

$$Subject\ to,\ \ C_t = (W + l_c W_c) - bl_c + sl_c$$

$$C_{t+1} = [l_c W + (1 - l_C)\, W_s]$$

$$l_c^u + l_c^s = 1$$

The optimization yields child labour supply function,

$$L_c = \bar{L}\, l_C(W, W_S, s, b) \quad (5)$$

$$l_c^u = 1 - l_c^s$$

The optimization yields an interior solution, however, there are three different cases where the household can allocate the child completely in education, or completely doing unskilled work, and/or both which rucially hinges on fulfilment of certain sufficient condition corresponding to specific rate of education subsidies.

There arise three different situations that are represented by the following lemmas.

Due to COVID-19 the economic contraction in various sectors has pushed many families into severe poverty because of which they were forced to push their children into labour works. Now even if the situation improves and the government provides a certain level of subsidy there is less chance the family will send their children to education.

No education and only work:

$$\textit{Lemma 1}: l_c^* = 1 \ \textit{when}\ W + b - s_1 \geq \beta(W_s - W)$$

Households would not at all be interested in education of child provided if the net opportunity cost of education is higher than the discounted gain from schooling. Lemma 1 holds under the above sufficient condition even without strict inequality. Thus $s_1 = W + b - \beta(W_s - W)$ is the critical subsidy level below which there will be no incentive for child's education.

This is the situation in which the child attains for schools and does not participate in any wage-earning activities.

Only education and no child labour:

$$\textit{Lemma 2}: l_c^* = 0, \text{when } \frac{\beta(W_s - W)}{W} = s_2 - b - W$$

Lemma 2 can be interpreted as household would prefers the child to spend complete time in schooling if there is parity between the future discounted relative gain from schooling and present value of subsidy net of opportunity cost. In other words, the subsidy must be in excess to opportunity cost of education by the magnitude equivalent to future discounted gain from schooling.

The subsidy level s_2 that is required to achieve $l_c^* = 0$ is given by

$$s_2 = (b + W) + \frac{\beta(W_s - W)}{W}$$

This subsidy (s2) includes the cost of education that includes both direct cost of schooling (b) and opportunity cost (W), and the relative discounted gain from schooling. Subsidies provided by either Government or various organization covers only the direct cost of schooling, however, our analysis brings out that it must include the other parameters as well.

In this circumstance, child allocates the time in skilling by attending school and also engaged in wage earning activities to supplement family consumption. This is the most observed scenario for most unskilled families in developing nations.

Both education and child labour (intermediate case):

Lemma 3: $0 < l_c < 1$ *when* $\beta(W_s - W) > (W_s + b - s^*)$

It explains that the discounted gain from schooling is higher than the opportunity cost net of subsidy, thus acting as participatory constraint.

The subsidy level that corresponds to the interior solution for l^*_c is given by s*,

$$w + b - \beta(W_s - W) < s^* < (b + W) + \frac{\beta(W_s - W)}{W}$$

Thus, the child education that corresponds to different subsidy levels is given by,

$$l_c^* = \begin{cases} 0 & if \ \ s^* < s_1 = W + b - \beta(W_S - W) \\ (0,1) & if \ \ s_1 < s^* < s_2 = (b+W) + \dfrac{\beta(W_S - W)}{W} \\ 1 & if \ \ s^* > s_2 \end{cases}$$

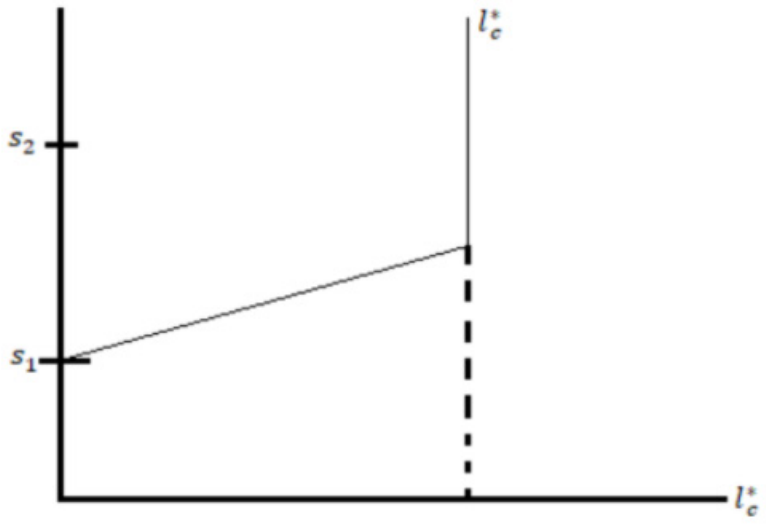

Figure 4. – Source: Self estimated

Figure 4 summarizes all the three lemmas. It plots the relationship between subsidies and child labour supply. If subsidy is below s1, this will be insufficient to generate any incentive for child schooling, thus l^*_c is vertical up to s1 at the origin. Subsidies higher than s1 but lower than s2 is sufficient for child participation in education although not complete level of education is attained. A subsidy s2 leads to a corner solution where household of the child prefers to have complete education. Under these conditions and increase in education subsidy targeted towards child schooling may be completely ineffective or partially effective accordingly s < s1 or $s \in (s_1, s_2)$. .

The General Equilibrium analogue

We construct a three sector- four factor competitive model, motivated by the work of Jones (1965) and Jones (1971). This is a small, open and a developing economy with a non-traded informal sector. Sector X is an informal export competing agriculture sector which consists of unskilled adult labour and child who are employed at wage rate W andWc . Sector Y is the high skilled export competing sector which consists of skilled labour who are employed at wage rate Ws and uses capital k. Sector Z is an import competing manufacturing sector which use adult labour and capital 'k' and the wage rate is $\bar{W}$ which is institutionally determined.

The prices of the traded sectors are internationally determined and the price of non-traded sector is determined in the domestic market, the demand for which comes from the expenditure of the skilled male and skilled female labour. All factors earn competitive return, however, the returns to capital are determined in the international capital market which this small open economy takes as datum.

The representative economy is given by the following set of equations:

$$Wa_{LX} + W_c a_{cX} = P_X \quad (7)$$

$$W_s(1+\rho)a_{sY} + ra_{kY} = P_Y \quad (8)$$

$$\bar{W}a_{LZ} + ra_{KZ} = P_Z \quad (9)$$

$$a_{LX}X + a_{LZ}Z = \bar{L} \quad (10)$$

$$a_{cX}X = \bar{L}l_c(W, W_s, W_c) \quad (11)$$

$$a_{kY}Y + a_{kZ}Z = \bar{K} \quad (12)$$

$$a_{sY}Y = \bar{S} \quad (13)$$

This is a non-decomposable structure. Constant Returns to Scale and zero profit condition hold across all sectors in both commodity and factor market. From equation 9 the value of r is determined. Once r is determined, from equation 8 the value of Ws is determined. Solving simultaneously equation (7) and equations (10)-(13) we solve for W, Wc ,X, Y and Z. This completes the determination of general equilibrium values of variables in the model.

Investment uncertainty due to COVID-19

Investment uncertainty leads to contraction in domestic capital formation which causes stock of capital in the economy to plummet, the outputs of High-skilled export sector (Sector Y) and Import competing manufacturing sector (Sector Z) contracts, respectively owing to fall in capital. This leads to an outflow of labour force from Sector Y which gets absorbed in the Informal Sector (Sector X). Labour supply in sector X increases which causes unskilled adult wage rate to plummet. Sector X expands owing to inflow of labour from sector Y, thus, the expanding sector X demand more child labour which causes child wage rate to accentuate. The fall in unskilled adult labour wage causes child labour supply to increase owing to the poverty-hypothesis, and an increase in child wage rate further escalates child labour supply owing to positive income effect. The following proposition is immediate.

Proposition 1:

Effect of pandemic in terms of fall in domestic investment accentuates aggregate child labour supply due to fall in family income of unskilled poor families. As the government reduces the formal unskilled formal labour wage in sector Z, it follows from equation 8 that to maintain price-average cost parity condition the return-on-investment rises. An increase in cost of capital in the high-skilled sector Y causes it to contract in terms of output. The contracting sector Y lowers the demand for skilled workers, thus causing skilled wage rate to fall (eq.7). The fall in skilled wage rate lowers the discounted present value of education for the child labour supplying family, thus supply of child labour increases while child schooling falls. The above discussion leads to the following two propositions.

Proposition 2:

Consider the effect of fall in training cost which enters into the high skilled import competing sector Y and import competing sector Z which causes expansion in both the sector. Since W is determined in eq. 7, thus adult unskilled wage rate remains unchanged. However, demand for skilled labour increases in sector 2 which accentuates the skilled wage rate. Now an increase in subsidy for children education can also be a corrective alternate policy for promoting child education and lowering the incidence of child labour.

Proposition 3:

A fall in training cum recruitment cost in the skilled sector or an increase in education subsidy could be alternative corrective policy which can lower the incidence of child labour.

Conclusion

The multifarious impact of COVID-19 has been observed in every sector around the world. The pandemic has increased economic insecurity, disrupted supply chains and halted manufacturing of essential commodities. Along with various other sectors, the education and schooling sector has been hugely wedged by the pandemic, its insinuations and reverberations. The school dropout rates have increased due to complications of the new-normal method of education and lack of availability of essential resources. This has further resulted in increased engagement of children in informal labour force. Our research shows that the effect of pandemic in terms of fall in domestic investment leads to a rise in aggregate child labour supply due to fall in household income of unskilled and poor families. Our findings provide enough evidence to state that government's policy response to COVID-19 disaster in terms of labour market reforms may aggregate the problem of child labour as the prime focus has been on relaxing labour laws to increase inflow of foreign investment in these unprecedented times. Finally we suggest that, a fall in training cum recruitment cost in the skilled sector or an increase in education subsidy could be alternative corrective policy which can lower the incidence of child labour.

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Appendix

$$Max\ U = C_t + C_{t+1} \quad (1)$$

Subject to,

$$C_t = (W + l_C W_c) - bl_c + sl_c \quad (2)$$

$$C_{t+1} = [l_c W + (1 - l_c)W_s] \quad (3)$$

$$l_c^u + l_c^s = 1 \quad (4)$$

Using eq. (4), (2) & (3) boils down to

$$C_t = (W + l_C W_c) - bl_c + sl_c$$

$$\therefore\ C_t = W + l_c(W_c - b + s) \quad (2.1)$$

$$C_{t+1} = [l_c W + (1 - l_c)W_s]$$

$$\therefore\ C_{t+1} = l_c(W - W_s) + W_s \quad (3.1)$$

Substituting eq. (2.1) & eq. (3.1) in U we get

$$U = \log[\, W + l_c(W_c - b + s)] + \log[l_c(W - W_s) + W_s\,]$$

To obtain an interior solution the F.O.C. is given by,

$$\frac{dU}{dl_C} = 0$$

$$\Rightarrow \frac{1 \times (W_c - b + s)}{W + l_c(W_c - b + s)} + \frac{(W - W_s) + W_S}{l_c(W - W_s) + W_s} = 0$$

$$l_C^{S^*} = \frac{W_s(b + W - W_C - s) - W^2}{2(W - W_s)(W_C - b + s)} \quad (5)$$

$$l_C^{u^*} = 1 - l_C^{S^*}$$

Table 1: Source – Self computed using data from ILO, World Bank and other sources

Country	Child Labour (%)	Poverty (%)
Afghanistan	21.4	54.5
Argentina	19	35
Bangladesh	13.4	21.8
Bhutan	3.5	8.2
Bolivia	20.2	16.6
Cambodia	8.1	13.5
Congo	38	63.9
Ghana	21	56.9
Iceland	21	9
Mali	56	49
Mexico	4.9	6.6
Myanmar	9.3	24.8
Nepal	21.7	25.2
Nigeria	31.5	40.1
Pakistan	21.5	24.3
Vietnam	13.1	5.8
Yemen	23	79
Zimbabwe	13	81.3
Mean	**19.97777778**	**34.19444444**

Feminist Economics and Policy: A Post-COVID Perspective

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Introduction

Feminist economics pushes for an alternate economic framework centred on the concept of care. It focuses on equity and social justice as opposed to the neo-classical, free-market principles that form the basis of the current economy. The modelling of the theory on these lines finds motive in the fact that women are consistently pushed to the bottom rungs in the current economic set-up. This happens because;

Firstly, the economy, interlinked with societal structures, assigns gender roles to different fields of occupation. Women, in this case, are generally assigned the jobs of 'care-givers', secondary players in the economy while the men are 'providers', the primary players, model the 'Homo Oeconomicus', on whom basic economic theoretical concepts such as rational choice, resource allocation and efficiency are built. This model seldom accommodates women's roles in the economy and so;

The economy rewards tangible productivity, linking labour with output. Therefore, supporters of the capitalist economy such as healthcare, education and unpaid are generally underpaid and undervalued. Women engaged in these fields are neither financially re-imbursed for their roles in the economy and nor are adequate policy measures being taken to induce them into the formal job market.

While feminist economics is not a comprehensive field of study as much as it is an integration of different perspectives, their guiding principles reflect a need for gender-equality in economics. This principle, its manifestations in several different economic theories and its implications and needs in the Indian economy post-COVID in particular, will be scaled through the length of this paper.

This paper aims to establish the theories and rationale of feminist economic models in light of the COVID-19 pandemic and the deepening of existing inequalities that ensued as a result of it. By way of examining the (albeit unconventional and broadly defined) feminist school of economic thought, the paper draws parallels with the background of traditional schools of economic throught, and critiques them. It aspires to identify the contribution and potential of a gender lens towards analysing responses to the pandemic, and further corroborates the need for gender sensitive economic, development, and public policy in order to emerge from the pandemic, to a better aligned socio-economic social structure. Lastly, the paper sets out to illuminate the potential of feminist economic thought for the re-development and fundamental revisiting of the concept and connotation of "the economy" and further de-patriarchalizing economic activities, growth, and decisions.

The findings of this paper are based on secondary data analysis and are a result of a blended approach of both qualitative and quantitative research methods. The methods undertaken involve an exploratory, evidence-based literature review, examination of current trends, and inference from data-based observations. This in-depth study employs a contextual theoretical approach grounded by deconstruction of models, in order to identify and respond to the intersections of gender and other micro, meso, and macro-level economic issues with special emphasis to the COVID-19 pandemic.

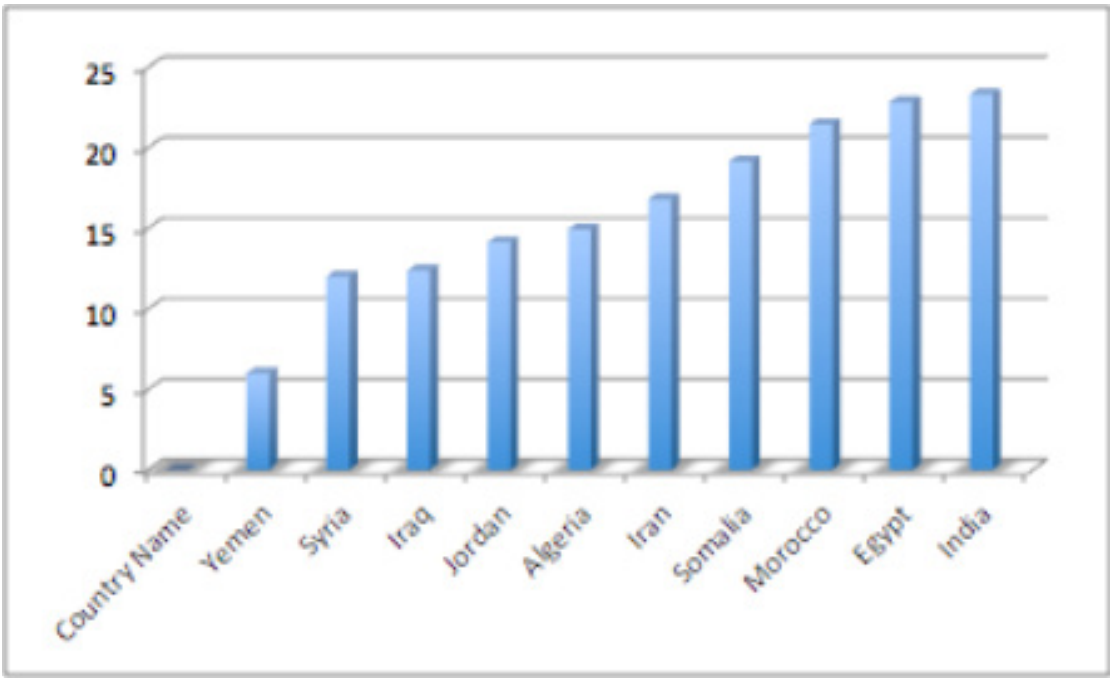
Our paper offers a critical review of the theoretical literature on the relationship between the production of scientific knowledge and its use in policy formulation and implementation -- extensive academic output, using a diversity of approaches and analytical frameworks. The purpose of this article is to offer a literature review on the subject of feminist economic and policy, based on selected authors, and to discuss their arguments and some of the main theoretical approaches to explain or back the relationship between the production of scientific knowledge and its use in policy formulation and implementation -- with the specific backdrop of the needs of a post-pandemic world in mind.

On the one hand, economic development alone is insufficient to ensure significant progress in important dimensions of women's empowerment, in particular, significant progress in decision-making ability in the face of pervasive stereotypes against women's ability. On the other hand, women's empowerment leads to improvement in some aspects of children's welfare (health and nutrition, in particular), but at the expense of some others (education). This suggests that neither economic development nor women's empowerment is the magic bullet it is sometimes made out to be. In order to bring about equality between men and women, in the view asserted by our conclusions, a very desirable goal in and of itself, it will be necessary to continue to take policy actions that favor women at the expense of men, and it may be necessary to continue doing so for a very long time. And especially in the context of the pandemic, the paper does not limit itself to calling for gender sensitive policies and initiatives, but also provides for a checklist for such policy-formation in terms of the main pillars backing the philosophy and rationale behind policy-making, going forward.

Background and Motivation

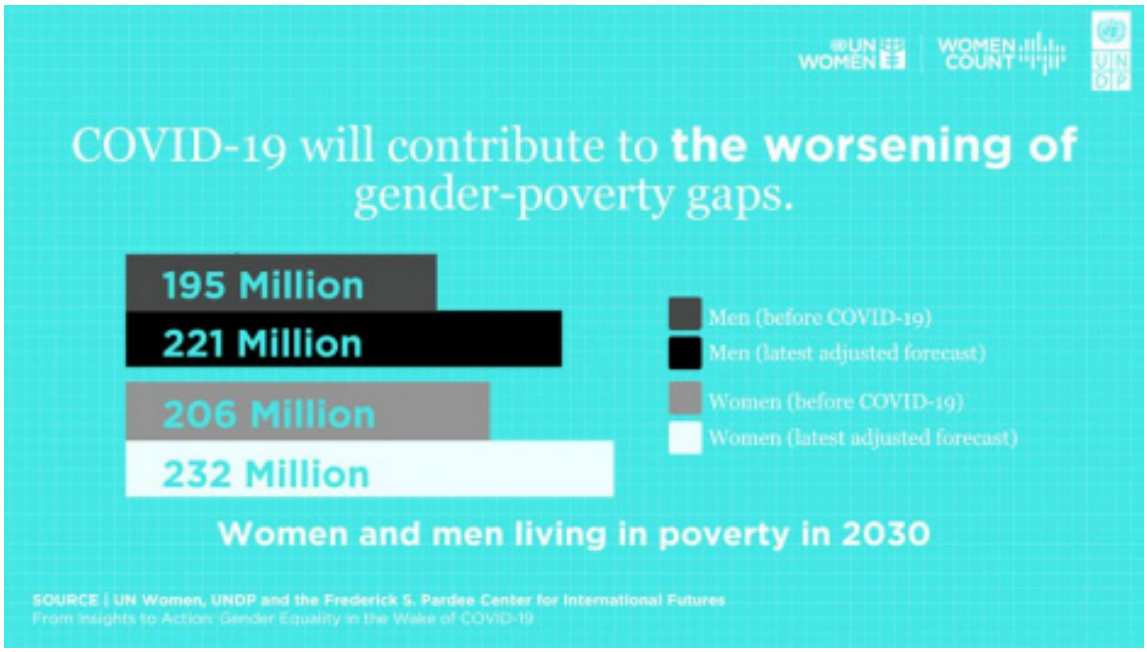
That the participation of women in the labour force is much less than that of men, is no unknown fact. Labour force participation (LFP rate) data released by the National Sample Survey Organisation of India (NSSO) shows that the rate has been in fact on a downward trend from 30.28% in 1990 to 20.53% in 2019, with the exception of the few years around 2005 when the rate hovered around 31%, as a result of which only nine countries of the world, including Syria and Iraq, currently have a lower proportion of working women than India. In India, among urban women who do work, domestic cleaning work is the second most common profession after textile-related jobs, the periodic labour force survey (PLFS) data published by

the NSSO shows. While some of the fall in women's workforce participation is explained by higher rates of higher education enrollment of women - as more than 50% representation was of women in Undergrad, M.Phil and Ph.D degrees in 2018-19, indicating that more young women are in higher education rather than working or looking for jobs, the data also points to a fall in working rates for older women. Among women in the prime working ages of 30-50, more than two in three women are not in the workforce, with the majority of them reporting that they are "attending to domestic duties only".



Country wise data of Labour Force Participation Rate (in %) as of 2019
Source: World Bank Development Indicators

The final facet to the current problem has been posed by the COVID-19 pandemic and its economic toll on women. As UN Women (2020)22 puts it,"For countless women in economies of every size, along with losing income, unpaid care and domestic work burden has exploded." Globally, 70% of the frontline workers and healthcare workers, who are battling it out in the face of the pandemic, are women. And yet, they are nowhere close to being at par with their male counterparts. This calls for an immediate, urgent, targeted response to the socio-economic crisis in the wake of the pandemic, that is rooted in the principles of gender budgeting, female workforce participation, and feminist economic appraoches to policy-making and implementation.



Men and Women Living in Poverty in 2020
Source: UN Women

This paper stems from an observation about the skewed narrative of relatively 'mainstream' discourse in the domain of Economics -- one that does not take into account the gendered aspect of theory and schools of thought. As aptly summarised by Dandekar (1982)33, "Economic development is generally conceived and defined to mean growth in per capita Gross Domestic Product. It follows that, to contribute to economic development, women must engage themselves in what is called 'economic' or 'gainful' activity as distinct from 'household' or 'non-market' activity. In other words, for a full integration of women in economic development, women must enter the 'labour force' on an equal footing with men."
Hence, deriving from all of the above motivations and observations, the objectives of this study are manyfold:

- Providing some broad parameters to identify the status of women in the Indian economy, - Analysing the female labour force participation in India, and juxtaposing it with the gender-budgeting initiatives in order to evaluate the performance of the same, - Relooking at the parameters delineating the status of women in the Indian economy, by taking into account the effects of the COVID-19 pandemic,

- Establishing the theories and rationale of feminist economic models in light of the COVID-19 pandemic to provide for a checklist for such policy-formation in terms of the main pillars backing the philosophy and rationale behind policy-making, going forward.

Dimensions of the Issue

This study aims to establish a relationship between the theories and rationale of feminist economics models in the light of the pandemic, COVID -19 and the critical analysis of the existing inequalities that it has created. We understand how the pandemic is based on the deterioration of gender gap rates and worsen the parallels amongst the traditional school of thoughts.

To get into the thorough scrutiny of our model, we have emphasized our study on the threefold levels, considering the paradigm shifts in the economy.

1. Household level

This level of analysis deeply encourages the study of gender budgeting and its impact at the household level. It focuses on the microeconomic analyses at the grassroot level by defining the problems and the factors involved in the exploitation of women, in particular. The study aims to be covering societal issues - from caste or gender-based discrimination to negligence of the women participation in the workforce.

1. State level

Under this understanding, a scrutiny of the austerity politics of the nation, proposed public policy frameworks, and the performance of the gender-driven policies is undertaken in order to delineate the status of decision making that can positively impact women. Further, a scope and extent of intervention in light of the COVID-19 crisis is explored.

1. Macroeconomic level

This level analyses gender disparities and biases in workplaces, industries and other socio-macroeconomic dimensions. Here, factors such as a collective gender wage-gaps, occupational segregation and the shadowed care economy are discussed.

Methodology

The explorations of this paper depend on secondary data analysis and are a consequence of a mixed methodology of both subjective and quantitative examination strategies - by means of a descriptive framework. The strategies embraced include an exploratory assessment of current economic indicators, and derivation from contemporary policy decisions. This in-depth study employs a contextual theoretical approach grounded in the deconstruction of models, to recognize and react to the convergence of gender and development issues, and finally contextualise an ideal approach for India to address the same. The data analysed has been sourced from multiple United Nations entities, the World Bank Development Indicators and that released by the Ministries of Women and Child Development, and Statistics and Programme Implementation, Government of India.

Literature Review and Analysis

1. Household level

Women in India represent 29 percent of the labour force, down from 35 percent in 2004. More than half of the work done by women in India is unpaid, and almost all of it is informal and unprotected. Women are not well represented in most sectors, including business leaders. Though they comprise almost 40 percent of agricultural labour, they control only 9 percent of land in India. Women are also shut out of the formal financial system. Nearly half of India's women do not have a bank or savings accounts for their own use, and 60 percent of women have no valuable assets to their names.

Women participation in the labour force has always been underestimated. Due to the indicators that affect Feminist economics are immeasurable, it becomes really difficult for the economists to understand and analyse the criticalities of the same.

The disparities at the macroeconomic level have only grown. The economic opportunity gap has worsened, widening to 257 years, compared to 202 years last year. The greatest challenges to closing this gap is women's under-representation in emerging roles, such as cloud computing, engineering and data and Artificial Intelligence.

"Violence, forced marriage and discrimination in access to health remain pervasive. The situation and the trend are more positive in terms of gender gaps in education... But a large difference persists for literacy rate; only two-thirds of women are literate compared with 82 percent of men," the WEF has said.
India ranks high on the political empowerment sub-index, largely because the country was headed by a

woman for 20 of the past 50 years. But, female political representation today is low as women make up only 14.4 per cent of Parliament (122nd rank globally) and 23 percent of the cabinet (69th), the report said. The factors that have led to the deterioration of the women participation in the labour force is ranging from domestic violence, social exclusion and other economic indicators which are immeasurable.

Despite the progress, women and girls continue to face multiple barriers based on gender and its intersections with other factors, such as age, ethnicity, poverty, and disability, in the equal enjoyment of the right to quality education. This includes barriers, at all levels, to access quality education and within education systems, institutions, and classrooms.

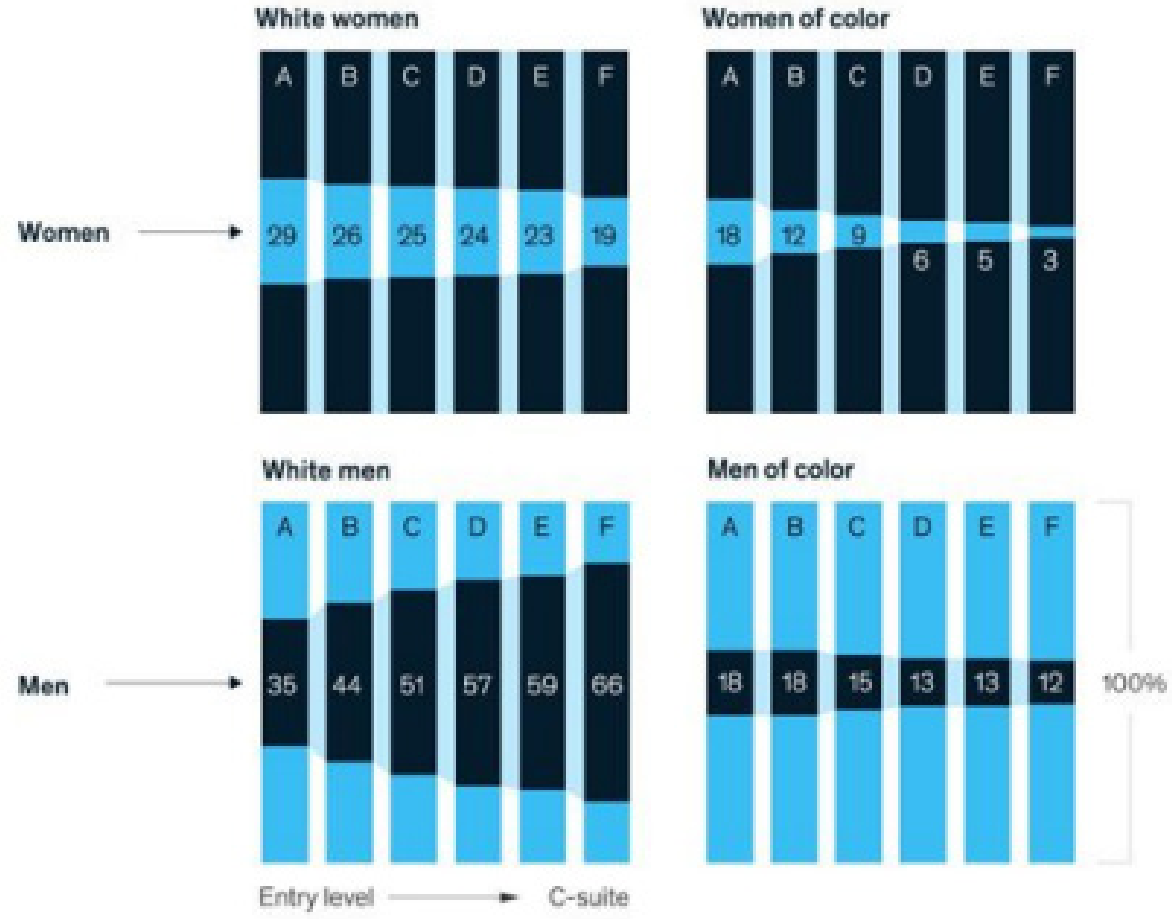
The other factors that decentralizes the gender inequality in the availability of resources and education include:

1. Harmful gender stereotypes and wrongful gender stereotyping
2. Child marriage and early and unintended pregnancy
3. Gender-based violence against women and girls
4. Lack of inclusive and quality learning environments and inadequate and unsafe education infrastructure, including sanitation
5. Poverty

For the sixth year in a row, the underrepresentation of women and women of color in senior management cannot be explained by attrition alone.

Representation by corporate role, by gender and race in 2020, % of employees

A = entry level B = manager C = senior manager/director D = vice president E = senior vice president F = C-suite



Source: *Women in the Workplace 2020*, LeanIn.Org and McKinsey, 2020

McKinsey & Company

The above figure shows that at the beginning of 2020, the representation of women in the corporate world was trending in the right direction. This was most pronounced in senior management: between January 2015 and January 2020, representation of women in senior-vice-president positions grew from 23 to 28 percent, and representation in the C-suite grew from 17 to 21 percent. This highlights the fact that the progress towards gender parity still remains slow.

Furthermore, especially in the context of India, the COVID-19 pandemic has further augmented the issues faced by women in households. Another recent analysis by McKinsey Global Institute noted that women are more vulnerable to COVID-19-related economic effects because of the already existing gender inequalities -- it estimates that female job loss rates owing to COVID-19 are about 1.8 times higher than the male job loss rates globally, at 5.7% versus 3.1%, respectively. Earlier this year as well, UN Secretary-General António Guterres noted that "COVID-19 could reverse the limited progress that has been made on gender equality and women's rights". According to UN Women44, an estimated 740 million women are employed in the informal economy. In developing nations, such work constitutes more than two-thirds of female employment - such as in India.

1. Macroeconomic level

It will be prudent to analyse gender biases in the workplace as a mirror and consequence of the hegemonic patriarchal narrative that Indian society largely supports. While progress in the development of the status of women has been exponential, especially in terms of higher education (ERIC, 2016) unacceptable gender disparities and stereotypes continue to largely prevail in India. The most obvious of this is the labour-force participation of women in India, which dropped to 21.36% in 2016 from an already low 25.68% in 2010 (World Bank data).

Resulting in significant wage gaps, a lack of promotions and high-level jobs for women, many sources identify gender bias in the workplace as spills from structural gender roles. For example, in leadership roles in the workplace, suitable characteristics are often assumed to be aggressiveness, confidence and decisiveness, or characteristics people associate with 'masculinity'. Women, in contrast, are assumed to be too emotional and weak to assume leadership responsibilities. Women are also expected to primarily devote their talents to 'care-giving' duties in the household. The findings of a research conducted amongst construction workers in Tamil Nadu (Barnabas, Anbarasu D, Pauls S, 2009) finds that men earn within the range of Rs. 71 to 250 while women earn in the range of Rs. 51 to 160 per day. Amongst the workers it was found that both men and women subscribed to seemingly untrue and baseless stereotypes about women being 'afraid of heights' and physically incapable of handling construction work.

Another aspect to gender bias in the economy is occupational segregation. This refers to an inherent differentiation between the occupations of men and women in the economy, leading to a differentiation in opportunities and rewards available to them (Prasad, Pratap, 2017). This occurs as horizontal and vertical occupational segregation (World Bank), where horizontal refers to a differentiation of sectors of occupation between the two sexes in the economy and vertical refers to the differentiation in positions held by men and women in the same sector. The ORF summarises reasons for the 'skills gap', which ultimately leads to a disparate occupational segregation.

1. Sociocultural - Factors that shape aspirations and ambitions based off of biased expectations and stereotyping of a woman's ability and responsibility.

2. Informational - There is a considerable gap in the accessibility of information and opportunities provided to men and women in education and jobs. For example, there is evidence of a systematic lack of investment in the education and skill développement of female children in India (Barcellos, Leandro S. Carvalho, Lleras-Muney, 2014).

3. Institutional - Institutional factors such as the safety, mobility and time restraints on women hamper their abilities to perform at par with men based on the market scale of efficiency.

There is also evidence that points to negotiation failures and a lack of bargaining power as a prevailing reason for a significant wage gap between men and women. Menzel and Woodruff (2019) allude to the `monopsony power' of employers in the labour markets in Bangladesh's garment sector. Hirsch provides an overview of this argument, explaining that a lack of women's mobility and a general limitation in geographical job searches give women a significant disadvantage in bargaining, making female labour supply `less elastic' to wage cuts. This lack of mobility pertains to women's domestic responsibilities towards the dependant members of the households such as children and the elderly. On the other hand, in `Women Don't Ask', Linda Babock draws attention to the internalization of socio-cultural oppression among women that prevent women from attaining top spots in the formal workspace.

Many experts claim that the selective traits required to advance in the corporate set-up of the economy have been designed to reward the dominant of the two sexes, as the primary `resource holder' (B. Coric, 2018) (Cabeza, Johnson and Tyner). The Global Human Capital Gender Advisory Council report (2008) refers to this as a `mini-me' syndrome amongst the men who occupy high-level positions in the economy creating structural segregation through succession planning. For example, according to Manning, there is a bias in the workplace against women as they often remove themselves from the workforce at the peak of their careers to provide for their families. Moreover, a majority of these women later have difficulties getting inducted back into the workplace (ILO,2018). "Our labour market severely punishes those who at any point in their lives sacrifice career for family", Manning adds. The economy, chained to modern society continues to be, as Coric puts it, designed `for men by men', skewed in performance appraisal and expectations.

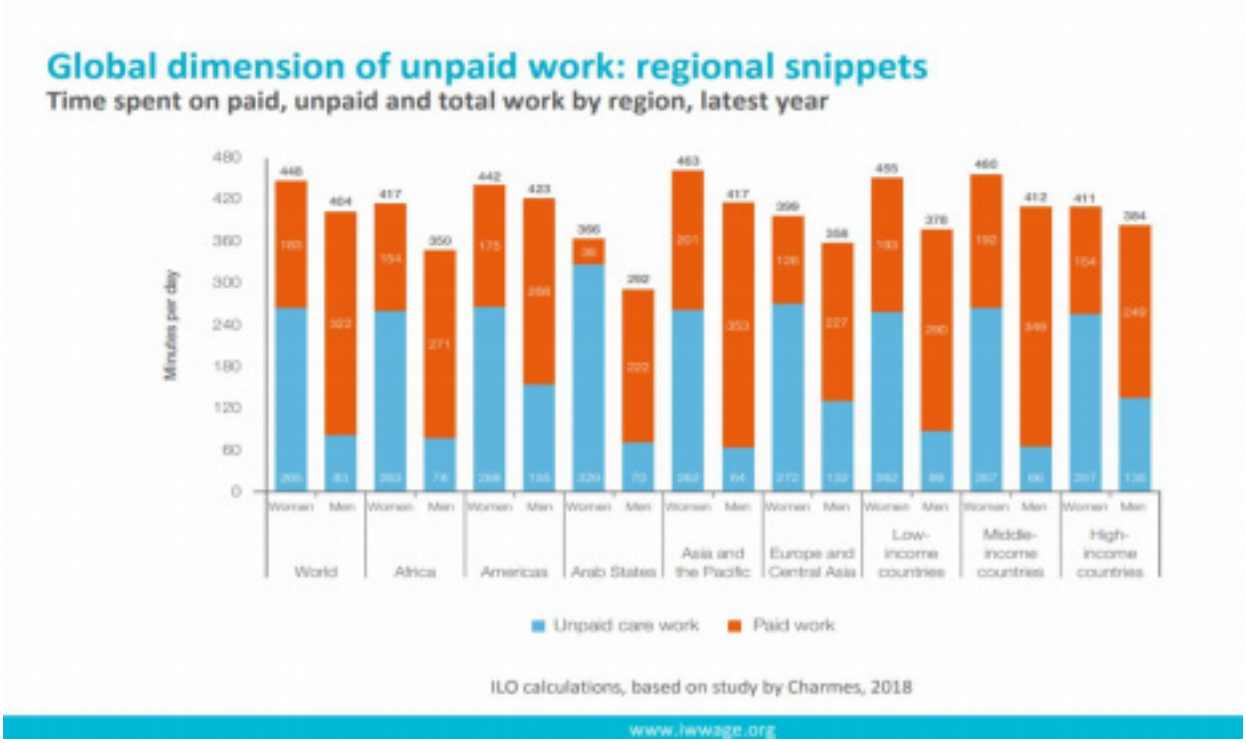
The Care Economy

A common thread that runs through the analysis of gender inequality in the formal economy is a systemic lack of representation of women in these sectors. Whilst analysing widespread issues such as occupational segregation and 'the pipeline problem', labour markets were found to be un-accommodative towards women, mainly owing to implicit insperabilities from unpaid housework, care work and reproductive responsibilities, leading to a lack of mobility, societal resistance and occupational segregation.

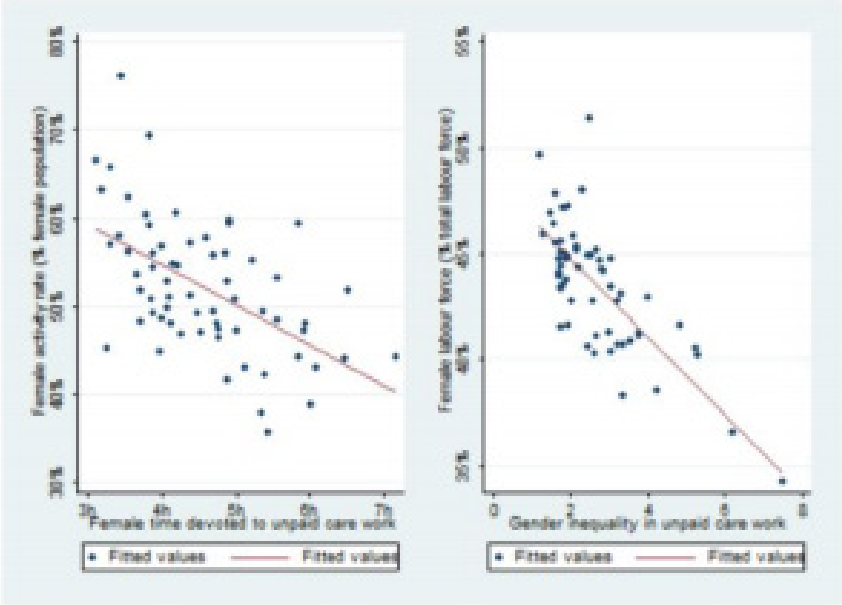
A separate lens, however, must compel us to argue against the consistent overlooking of female centred economic sectors instead of pushing for female representation in male designed and dominated areas. Here, paid and unpaid care work emerges as a major point of contention.

Folbre (2011) defines Care work by its functionality: activities that are personal or activities that benefit those "lacking political voice" such as children, the elderly and the disabled. Care work thus encompasses activities that are domestic and unpaid as well as those that are underpaid extensions of the formal economy.

In 2018, 8.9 billion hours were spent by individuals in unpaid care work (ILO, 2018) in Asia and the Pacific. About 80% of this unpaid care work is done by women. Reports by ILO (2018) show that women in India, specifically spend 297 minutes per day engaged in care work, as opposed to the 31 minutes spent on such activities by men. The same report shows that the nature of the care work that engages women is more time consuming and physically strenuous as compared to those performed by men.



The statistics on unpaid care work explain some of the extensive gender-based disparities in the Indian economy. For example, there is a negative causal relationship between the amount of unpaid care work performed by the female population of a region and the female labour participation rates there.



Note: The left graph presents the predicted value of female activity rates as a percentage of total women in the working-age population by time devoted to unpaid care work by women, controlling for GDP per capita, fertility rate, female unemployment rate, female years of schooling, urbanisation rate, maternity leave and regional dummies. The right-hand graph presents the estimated female share of the labour force by the female-to-male ratio of time devoted to unpaid care activities, controlling for GDP per capita, fertility rate, urbanisation rate, maternity leave and gender inequality in unemployment and education.

Source: World Bank (2014), *World Development Indicators* and OECD (2014), *Gender, Institutions and Development* Database.

This explains several of the most severe problems with women in the economy in India. The expectation for women to take up care work and domestic work hampers their ability to participate in the labor force because of the `double burden', in which they must engage in domestic work as well as participate in the market. This takes a toll on the women's mental and physical health and well-being (Sengupta and Sachdeva, 2017). Moreover, this limits women to engage in primarily vulnerable and unstable jobs that are usually undervalued and under-paid.

This section of women include daily wage workers, rural agricultural laborers and urban domestic workers. Domestic workers in India may be a prime example of lack of safety mechanisms available to women in an `unskilled' occupation (Chandramouli, Kodandarama). Domestic workers, who are predominantly women, are usually uneducated and migrants from rural agricultural sectors relocated to urban labor markets.

These women are often uneducated and poor. These women do not have access to formal mechanisms such as labor unions and legislations or complete market information, as a result, they are generally underpaid, denied safe work spaces and made to work long hours. Domestic workers also often face violence, harassment and sexual abuse (WEIGO).

Owing to occupational segregation and over-arching patriarchal conditioning, paid care work is also predominantly constituted by women. Paid care work consists of paid services such as teaching and healthcare services. Even though, with India's fast predicted aging population, care work is essential, it is poorly remunerated and formalised in the economy. India care workers grapple with poor infrastructure, pay and regulation in their jobs.

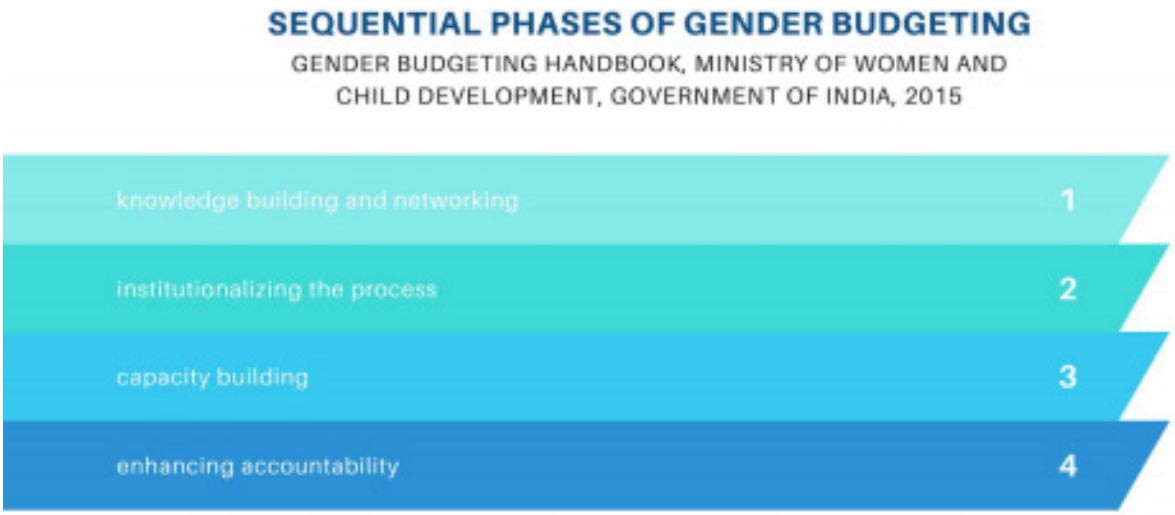
Feminist economists push for more recognition of the shadowed care economy. They believe care work produces one of the most essential resource bases of the formal capitalist economy: social reproduction. Social reproduction refers to the act of caring for oneself and for others. It refers to the activities that enable persons to contribute to the workplace such as education, nursing, emotional support and nutrition. However, current economic hierarchies push care work and social reproduction to the bottom rungs, rewarding these activities the least. In India, owing to strong patriarchal traditions, care work is almost fully unpaid and unrecognised. This is a primary reason for inequality in the economy, with special reference to gender inequality. In India, however, this may prove to be more of a challenge than with other nations of similar demographics. Patriarchal norms in India continue to be strongly held by households and society, showing minimal demand for care work to be given monetary acknowledgement. (Choudhary, Tripathy and George, ESAF, 2009)

However, it must be noted that care work and social reproduction is intrinsically linked to the formal economy. For example, 'The crisis of social reproduction' , essentially the lack of proper remuneration and infrastructure in care sectors, shows direct links to the 'crisis of work' and the rise of automotive industries that may extensively cut back employment. India is a preeminent target of the work crisis (Hester, 2018). With automotive industries pushing people out of employment, care work is one of the largest employing sectors in India (ORF, 2020). To raise standards of living of the people within the country, it may be essential to re-centre economic structures around the care economy. According to estimates, the amount of unpaid care work undertaken by women in India could measure up to the creation of 11 million potential jobs. This could be leveraged by policy makers to make more care-centred transitions in the Indian economy (ORF, 2020).

3. Statelevel

Gender equality is a basic, albeit imperative sociological indicator for any society. Its standard is additionally found in the SDG 2030 Agenda where the signatories, including India, reaffirmed their responsibility to mainstreaming gender improvement and guaranteeing equivalent portrayal of women in political and economic dynamics. Strengthening, expanding and encouraging the gender budgeting standards for asset distributions as a basic essential for India to accomplish progress towards the SDG-5 on gender equality. In view of a survey of the principles of financial devolution and central government budget reports, it is obvious that gender-sensitive concerns remain a dismissed part of India's financial strategy. Gender planning ought to get sufficient concentration and be concurred high need by the fifteenth Finance Commission of India, in order for better indicators and results to be realised in the grassroots level.

According to Rudra (2018)55, "gender budgeting has both intrinsic and instrumental relevance. GRB is critical for eliminating gender inequalities with significant improvements in social, educational, health and economic indicators of a country." Furthermore, it translates into a "systematic gender-differentiated impact of fiscal provisions, programmes and policies". However, the implementation of gender budgeting is yet to be made 'mainstream' in the context of India - no more than seventeen Indian states have gender budgets, the horizontal and vertical devolution of the states' share of fiscal transfers (by the Centre, as mandated by the Finance Commission) has no mention or factoring in of the gender lens, as well as, gender inequalities are yet to be tackled by the intergovernmental fiscal mechanisms. These issues have been highlighted in the recent past by researchers such as Lahiri (2019)66 and Rudra (2018).



It is not unknown that Indian society has been grappling with magnitudinal disadvantages to women in all walks of life for many years now. With more than 60 percent of women getting married before 25 years of age in India, the UNDP Gender Development Index ranks India among the lowest. In the Gender Inequality Index, meanwhile, India is ranked at a dismal 125th place out of 159 countries in 2018-19.

Indicator	Rural India		Urban India		All India	
	Male	Female	Male	Female	Male	Female
Labour force participation rate, 2015-16	77.3%	26.7%	69.1%	16.2%	75.0%	23.7%
Life expectancy at birth, 2009-13	64.6 years	68.1 years	69.6 years	73.0 years	65.8 years	69.3 years
Infant Mortality Rate, 2016	37	40	22	25	33	36
Maternal Mortality Rate, 2017				174 per 100,000 live births		
Illiteracy	22.9%	42.1%	11.2%	20.9%	19.1%	35.4%
Literacy	77.1%	57.9%	88.8%	79.1%	80.9%	64.6%
Matriculate	13.5%	8.2%	17.7%	14.5%	14.9%	10.3%

Gender Differentials in India's Key Development Indicators
Source: Rudra (2018)

The GII is an inequality index released by UNDP that measures gender inequalities in three important aspects of human development:

1. Reproductive Health, measured by maternal mortality ratio and adolescent birth rates;

2. Empowerment, measured by proportion of parliamentary seats occupied by females and proportion of adult females and males aged 25 years and older with at least some secondary education; and

3. Economic status, expressed as labour market participation and measured by labour force participation rate of female and male populations aged 15 years and older.

In the Gender Inequality Index (GII), India is at 122 out of 162 countries. The report of 2019 forecasts that it may take 202 years to close the gender gap in economic opportunity. These observations highlight not

only the dire issues related with state level policies in addressal of gender issues through the lenses of development and economic policy, but also the exclusionary nature of the measurement of our 'welfare' indicators - the most prominent example being that of GDP. According to the World Economic Forum (2016)77, "Women do a majority of this unpaid work (on average in the OECD countries women do about twice as much, 150 minutes a day more, as men in the home). Because it is not measured, it is generally overlooked by economic policy. The omission of housework and caring (part of "home production" in the technical language) is so familiar now that few people realise there was a vigorous debate about whether or not to include it in GDP when the modern system of national income accounts was created in the 1940s." In a 2011 study88, the OECD concluded that the inclusion of women's contribution in terms of "home production would add between 20% and 50% to the GDP of its member countries."

At the state level, it is also essential to bear in mind workplace policies, especially at a time marked by crisis and uncertainty, the choices companies and institutions make today in terms of their policies, will have consequences on gender equality for decades to come. According to McKinsey's Women in Workplace report of 2020, "if companies make significant investments in building a more flexible and empathetic workplace—and there are signs that this is starting to happen—they can retain the employees most affected by today's crises and nurture a culture in which women have equal opportunity to achieve their potential over the long term." However, due to the challenges created by the COVID-19 crisis, as many as two million women are considering leaving the workforce, only in the United States. This response is expected to be further augmented in informal and unregulated workplaces, especially in the Indian context where women's participation is determined by societal and familial constructs. In order to create better and more inclusive workplaces, both men and women should be offered flexi-time, job-sharing opportunities, and work-from-home options as much as possible, in order to be able to take on the 'new normal' better and share workloads in homes and communities as well as workspaces. Organizations should additionally try to incorporate onsite childcare facilities wherever possible. Lastly and most importantly, organizations need to deploy systems and policies to facilitate women's navigation through a system designed for men by encouraging the need to raise concerns and ensure they are being addressed throughout organisational frameworks and networks. Maternity leaves and other government workplace policies have done little to correct these biases and hence, have been unable to successfully raise the FLP (Pande, 2017). Moreover, rather than empowering women, many gender sensitive workplace policies firmly place the exclusive responsibility of shouldering the 'double burden' onto women.

According to research by Pande (2017), policymaking has not been successful in bringing about the improvement in gender indicators as expected, especially in public institutions. Most of all, policy changes despite decades of interventions and policy catalysis have been unable to bring about changes in the deep-rooted regressive behavioural and social norms. Hence, for the effective implementation of a robust

gender budgeting or gender lens expenditure ideal, India needs broader support along the constitutional principles and institutional mechanisms to steer policymaking and coordination at all levels of federal governance.

Lastly, a paper by Griffin (2015)99, " -- adopting a discursive approach to gender and governance that situates gender centrally in understanding governance discourses and their reproduction of common sense (about what people do, how they labour, where they invest and so on), -- argues that the governance of crisis in the contemporary era, in particular the various actors, institutions, policies and ideas that have sought to describe and 'contain' the global financial crisis, are gendered," further reinforcing the rationale for looking at crises and austerity through a gendered lens.

Interlude

A COVID-19 Perspective

Emphasizing the issues ranging from healthcare, domestic violence to female education, we can draw conclusions how the pandemic has affected the female population within these domains.

The COVID-19 pandemic has put some health systems under immense pressure and stretched others beyond their capacity. As such, responding to this public health emergency and successfully minimizing its impact requires every health resource to be leveraged. Failure to protect health care in this rapidly changing context exposes health systems to critical gaps in services when they are most needed, and can have a long-lasting impact on the health and wellbeing of populations. Care sectors such as nursing, healthcare and old age care need greater investment now that the magnitude of epidemic and disease spread is projected to rise.

There is a need for extra efforts to strengthen the public health system and increase health budgets to optimise service delivery and health facilities ensuring women safety and security.

According to the FICCI-EY study on the economic impact of the pandemic on the healthcare sector, virus outbreak had resulted in a 70-80 per cent drop in footfall, test volumes, and a 50-70 per cent drop in revenues at the end of March. The study also revealed that the sector is expected to witness short-term operating losses. The maximum impact of the pandemic has been felt by the women. Therefore, it is said that we still have a long way to go.

There are clear links between COVID-19 and domestic violence, which also impact on the economic and social crisis. Multiple reports, however, suggest that such measures are increasing the incidence

of domestic violence and not only in number but also in severity. We find that layoffs, loss of income, extended domestic stays, and exposure to habits due to stay-at-home orders are driving up the incidence of domestic violence. Moreover, these domestic violence increases are driving economic and social crises due to the form and severity of the violence, the burden placed on government, a crisis of resources, and decreases in the productivity of workforces. Domestic violence increase resulting from Covid-19 is an indirect driver of economic and social crisis. The social isolation has led the abusers to take more advantage of it.

Poverty is one of the most important factors for determining whether a girl can access and complete her education. Studies consistently reinforce that girls who face multiple disadvantages — such as low family income, living in remote or underserved locations or who have a disability or belong to a minority ethno-linguistic group — are farthest behind in terms of access to and completion of education.

Violence also prevents girls from accessing and completing education – often girls are forced to walk long distances to school placing them at an increased risk of violence and many experience violence while at school. Most recent data estimates that approximately 60 million girls are sexually assaulted on their way to or at school every year. This often has serious consequences for their mental and physical health and overall well-being while also leading to lower attendance and higher dropout rates. An estimated 246 million children experience violence in and around school every year, ending school-related gender-based violence is critical. Adolescent pregnancies can be a result of sexual violence or sexual exploitation. Girls who become pregnant often face strong stigma, and even discrimination, from their communities.

Feminist Economic Theories and Models

Feminist economics provides a consolidation of various theories and proposals with a central motive: to provide an economic framework that centres on equality, sustainability and care. Some pivotal transformational theories suggested in feminist economics are as follows:

The Care Diamond

According to the UNDP, women's labor force participation rate is "M-shaped": it drops when they are in their late 20s and early 30s and are typically caring for preschool children. The reason for the M-shaped curve is quite clear. Women tend to quit work first at marriage, and then after the birth of their first child. Nearly half of the women who have had full-time permanent jobs leave work after marriage, and again, nearly half of those who retained full-time work quit the labor force after the birth of their first child. Thus, the percentage of non-working women increases after the birth of their first child. At the same time, many also raised the difficulty of balancing work and family obligations.

This suggests that even if childcare arrangements are available, the job makes it impossible for women to choose to raise children while working. These expectations include long working hours, long commuting time, and uninterrupted work (no maternity leave). There are also concerns about the quality of work . However, small corporations are exempt from these regulations. Also, there is considerable pressure on women, and especially men, not to take the full year off. The take-up rate of paternity leave is abysmally low at 1.56 per cent, while that of maternity leave is 89.7 per cent of those eligible. Some suggest that this is because enforcement of these family-friendly policies is weak, and that the government uses "administrative guidance", rather than sanctions and punishments, to encourage employers. n, the tax and social security systems reinforce women's secondary role in the labor market by setting a limit on how much they can earn before losing their status as a dependent spouse and therewith their exemption from paying tax and social security contributions. As a result, the forces that bind women to the caregiver role are multiple and reinforce each other. They are further reinforced by the state's expectations that a woman will be a housewife, a caregiver and a low-wage worker.

According to Rudra (2018)55, "gender budgeting has both intrinsic and instrumental relevance. GRB is critical for eliminating gender inequalities with significant improvements in social, educational, health and economic indicators of a country." Furthermore, it translates into a "systematic gender-differentiated impact of fiscal provisions, programmes and policies". However, the implementation of gender budgeting is yet to be made 'mainstream' in the context of India - no more than seventeen Indian states have gender budgets, the horizontal and vertical devolution of the states' share of fiscal transfers (by the Centre, as mandated by the Finance Commission) has no mention or factoring in of the gender lens, as well as, gender inequalities are yet to be tackled by the intergovernmental fiscal mechanisms. These issues have been highlighted in the recent past by researchers such as Lahiri (2019)66 and Rudra (2018).

Multi-Sector Model

A multisector model is used in principle, "to study the allocation of resources across different economic activities". As any country and its economy grows, its production, economic activities and employment structure transition from agriculture to industry and services, with services eventually claiming the vast majority of the country's employment engagement. "One class of institution-based multi-sector models is motivated by the fact that official statistics only report formal market activities". However, there are plenty of studies that show that a large fraction of resources in any economy are allocated to activities in the informal sector and activities at home. These studies are based on the time-use surveys conducted by individual countries, such as the United Kingdom and the United States, and on a cross-country survey conducted by the World Bank in 2000. Home production is substantial in most of the time-use surveys.

The production activities at home and in the informal sector can all potentially be accounted for so that they can enter the official statistics and formally contribute to the value of economic development, which becomes even more important for developing countries. The multisector model by Stephen Parente, Richard Rogerson, and Randall Wright (2000), is one that fits the bill aptly, and says that goods can be produced in the nonmarket sector or in the market sector. They show that distor-tionary policy that affects capital accumulation has a larger impact on measured GDP in their multisector model than in the usual one-sector model. Hence, these models add to the understanding of the dynamics of women's participation in the economy and their true contribution to economic development.

Recommendations

1. Integration of gender lens in the Local Self Government Bodies of the nation, under the Panchayati Raj system, in order to call for greater independence and involvement of women in financial and political decision-making. Further, put in place unions for domestic workers and other paid care workers in all areas.

2. Put in place an independent central and state level mechanism for increased investment in the care economy.

3. Exploring gender-sensitive resource transfers by way of integrating gender in the horizontal and vertical devolution of the states' share of fiscal transfers.

4. Calling for multi-stakeholder involvement towards gender lens fiscal decisions - budgeting and investing in particular, on both government policy and private engagement ends.

5. Applying gender mainstreaming across national and local policies that rely on the creation of capital infrastructure. Ensure government welfare schemes such as safety, public transportation, old age care and healthcare that reduces women's unpaid care burdens and furthers women's skill development and career prospects.

6. Offering gender-sensitive training to key city stakeholders (police, transport operatives, urban planners, and national and local government officials).

7. Conducting gender-lens data collection and analysis across relevant campaigns, policies, projects, and organisations.

CHECKLIST

Gender-Sensitive Policy Pillars Post-COVID

Integration of gender lens in the Local Self Government Bodies of the nation in order to call for greater involvement of women in financial and political decision-making. Further, put in place unions for domestic workers and other paid care workers in all areas.

Put in place an independent central and state level mechanism for increased investment in the care economy.

Exploring gender-sensitive resource transfers in the horizontal and vertical devolution of the states' share of fiscal transfers.

Calling for multi-stakeholder involvement towards gender lens fiscal decisions on both government policy and private engagement ends.

Mainstreaming policies that rely on the creation of infrastructure, increase welfare schemes that reduce women's burden of care work.

Offering gender-sensitive training to key stakeholders (police, transport operatives, urban planners, and national and local government officials).

Conducting gender-lens data collection and analysis across relevant campaigns, policies, projects, and organisations for better evaluation.

AIM

This model is aimed towards providing a framework for policy principles that should be encouraged and inculcated into policy-making to make it gender-sensitive, especially in the face of the disparities created due to the pandemic.

Gender-Sensitive Policy Pillars Post-COVID Checklist: Authors (2020)

Conclusion

As the ongoing pandemic rages on globally and brings economies, cultures, and governments to their knees - the changes being discerned during this historic time are bound to impact the threads of the social fabric of the world as we know it. The decision of the government of India of extending assistance to women Jan Dhan account holders with direct cash benefit transfers, encouraging credit-lending to self help groups in rural areas, and some state governments leading the distribution of period products in their districts through community collectives are a few of the many ways in which our country is pooling in its resources to help the women and girls of the last mile.

Historically, crises have been instrumental in bringing about societal changes - be it women taking up jobs in factories when men had to fight during the second World War or the increasing number of women breadwinners post the Great Recession. However, during the current pandemic, the shift towards more equitable caregiving wouldn't come as a systemic or natural change, albeit it will need an intentional push to come about.

Limitations of this Paper

1. Since the models we suggested are extracted from the other countries, it is extremely difficult to forecast their application and implementation in the long run. It is quite unfeasible to implement them in such a manner that it leads to gender equality providing women with better access to resources and more power.

2. The contribution by the women involved in the unpaid care work also gets negligent in the measurement of the economic indicators. This makes the analysis models proposed quite ambiguous and makes the policy makers rethink the gender budgeting plans.

3. The figures derived are from secondary sources. This doesn't validate the fact that the analysis is perfectly accurate and reliable. Also, it makes the makeup of the gender budgeting plans irrelevant for the indicators whose figures that stand unknown to us.

4. Since not all the indicators are measurable and known to us for the computation of the gender budgeting, we still can't rely completely on the models proposed by us.

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Analysis of Environmental Policies in India: Simulation Using Computable General Equilibrium Model

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Abstract

A comprehensive assessment on the effect of pollutants on economy has revealed that the market impact of air and water pollution leads to significant economic cost and hence annual global welfare cost.

We hence develop a General Equilibrium Model which shows socially optimum levels of production by different firms and their effects on the consumption under the environmental impacts. This provides the theoretical framework of our model. Now, the policies regarding environmental protection will lead to sustainability as pollution affects health which in turn affects productivity of the human agents of the economy. Thus, productivity of agents will remain intact or may increase in the model due to the application of those policies rather than having a decay due to bad air quality owing to pollution.

Besides air pollution this paper also highlights the status of sewage and wastewater treatment in a similar fashion.

Then we simulate the effects of such policies with data on Indian Economy in a Computable General Equilibrium (CGE) model by building Social Accounting Matrix (SAM) based on different microeconomic aspects according to our model. We extend the traditional SAM by incorporating the following environmental factors. Firstly, we include the emission of pollutants from different sectors. Secondly, we consider water treatment plants as a unique sector of the economy. Finally, with environmentally extended SAM in the CGE model we compare different policies which a government can take and also analyses and quantify the costs and benefits of the policies using GAMS software.

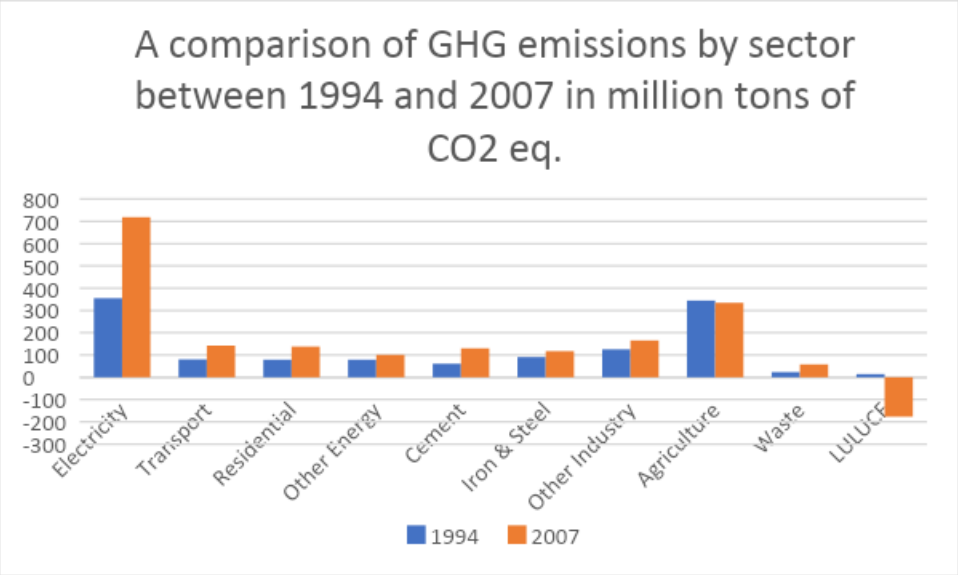
Keywords- CGE Models, General equilibrium, Pollution Control, Abatement Cost, Government Policy

JEL classification- C68,D58,Q52,Q58

Introduction

Often something which is invisible, causes harm at a greater extent. Air pollution is such a threat to mankind. The standard way of determining air pollution severity is to measure PM2.5 readings.

On the other hand, sewage disposal and wastewater treatment are serious issues in developing countries. Untreated sewage water not only contaminates the environment but also hampers the health of people.



Source: INCAA report

Thus, it becomes important to analyse how the economy will be affected when emissions are reduced. A reason for the sluggish behaviour of the economic agents to switch over from carbon fuel to more renewable and non-conventional energy sources is that such shocks can be detrimental to the health of the economy. Thus, we don't take initiative to develop such technology which can be used for better and greener environment.
The paper is structured in the following way: Section I presents a general equilibrium model which provides a theoretical background of effects of pollution. Section II provides the construction of the SAM, CGE modelling and extension to its environmental aspect. Section III shows the first simulation of a decrease in carbon emission. Section IV gives the extension of basic SAM to another ESAM by incorporating water pollution and abatement sector and provides a simulation of a decrease in COD emissions by different sector. Section V gives a policy review and conclusion.

Literature Review

There is a growing literature on compilation of social accounting matrices and computable general equilibrium models as we want to analyse policy options, though there has been less emphasis on environmentally extended SAMs literature in India.
Keuning (1993) in his paper `National Accounts and The Environment: The Case for A System's Approach' proposed pollution effects should be incorporated and accounted for in the traditional SAM to extend into a national accounting matrix (NAMEA). Xie (1995) constructed an EESAM or environmentally extended SAM which includes pollution abatement sectors which have been included in our analysis on India. Xie extended the SAM in many ways which accounted for the pollution taxes, subsidies in separate accounts and gives a comprehensive outlook on Environmentally extended SAM. Horridge et al. (2005) developed the TERM CGE model to consider the economic impact of drought. Onil Bannerjee et al. also provide a nice framework of including natural resources in the analysis of SAM construction.
CGE modelling has been used in many policy simulations in India. A. Ganesh Kumar et al. showed dynamic recursive simulations for increase in government consumption expenditure

on various endogenous variables for the Indian economy which includes GDP growth, export import values, domestic demand etc.
Koushik Das et al. in their paper 'General Equilibrium Analysis of Strategic Trade: A Computable General Equilibrium Model for India' show several policy simulations on international trade. Import liberalization, increase in capital inflow and technological change and consumers preferences were simulated.

Section-I
Theoretical Model

We first present a simple model which explains and describes the functioning of an economy taking into account emissions and pollution. The general idea is we can think emissions as an input of the firm which if it uses more leads to more output. Emission permits the firm to use of more energy and fuel (low cost) and thus leads to more output. Thus, we take emissions as an input which accounts for different production activities necessary. We suppose there are N number of firms and M number of agents in the economy and each firm produces only one good

The production function of j^{th} firm among N firms in the economy is given by

$$Q_j = AF_j(L_j, K_j, E_j, x_{1j}, \ldots\ldots, x_{Nj}) \quad , \quad j = 1(1)N$$

This represents the total output produced by the j-th firm in the economy using three inputs labour (L) , capital(K) , emissions(E).

x_{ij} represents the intermediate inputs where input of i^{th} industry is used to produce the output of the j^{th} industry, where $i = 1(1)N$
A is the level of technology used by the firm.
The assumptions of the production functions are

$$Q_{jL_j} > 0, Q_{jKx_j} > 0, Q_{jE_j} > 0, Q_{jx_j} > 0, \quad i = 1(1)N$$

$$\frac{\partial \mathrm{Q_{jL_j}}}{\partial \mathrm{L_j}} < 0, \frac{\partial \mathrm{Q_{jK_j}}}{\partial \mathrm{K_j}} < 0, \frac{\partial \mathrm{Q_{jE_j}}}{\partial \mathrm{E_j}} < 0, \frac{\partial \mathrm{Q_{jx_{jj}}}}{\partial \mathrm{x_{ij}}} < 0, \qquad i = 1(1)N \qquad \frac{\partial \mathrm{Q_{jL_j}}}{\partial \mathrm{E_j}} < 0, \frac{\partial \mathrm{Q_{jK_j}}}{\partial \mathrm{E_j}} > 0$$

We suppose the following pollution function which describes the amount of pollution occurring due to emission,

$$P = P(E), P > 0,$$

where E is that amount of total emissions chosen from all firms' the profit maximizing conditions.

$$E = \sum_j E_j$$

The profit maximising j^{th} firm maximises the following problem.

$$\prod_j = \; p_j AF_j(L_j, K_j, E_j, x_{1j}, \ldots . x_{Nj}) - (wL_j + rK_j + \textstyle\sum_i p_i x_{ij})$$

P_j is the price of the j^{th} output, w is the wage level of labour and r is the rent of capital.
The first order conditions are

$$\frac{d\Pi_j}{dL_j} = AF_{jL_j} - w = 0\,;\ \frac{d\Pi_j}{dK_j} = AF_{jK_j} - r = 0\,;\ \frac{d\Pi_j}{dE_j} = AF_{jE_j} = 0\,;\ \frac{d\Pi_j}{dL_j} = AF_{jL_j} - p_i = 0\,;$$

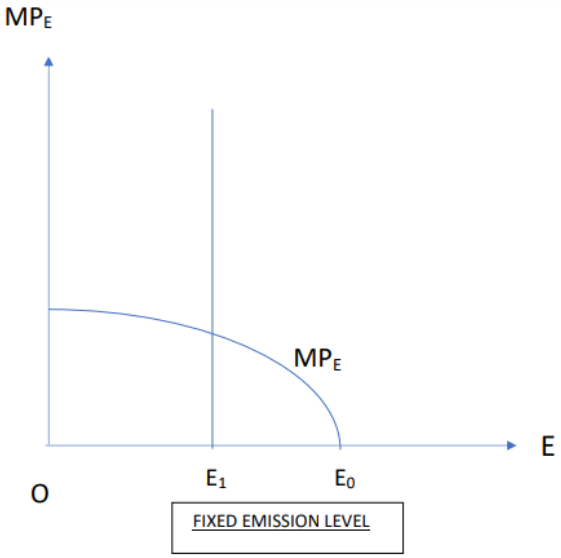
Solving these equations, we obtain the optimum level of inputs, L_0, K_0, E_0.
In the consumer side the utility function of the k th individual is given by $U(f_{1k}, f_{2k}, \ldots\ldots f_{Nk}, P)$ where f_{ik} is the final demand of the i^{th} good by households.

The assumptions are $U_{f_k} > 0, i = 1(1)N, U_p < 0$

The consumer wants to perform the following maximisation problem.

$Max\ U(f_{1k}, f_{2k}, \ldots\ldots f_{Nk}, P)$ s.to $M = \sum_{k=1}^{N} p_i f_{ik}$ Where M= money income of the consumer

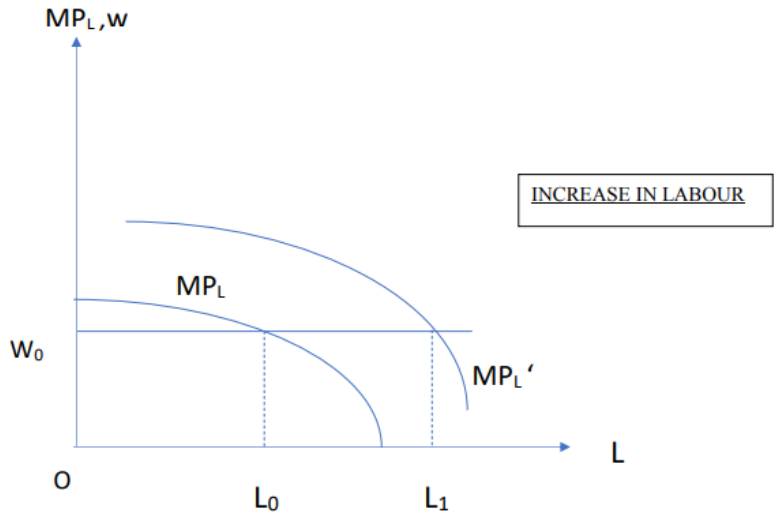
Suppose emission target are set for all the j firms at some specified level E_1 which is obviously binding condition. The changes in the optimum input level are shown graphically. The level of emission is fixed at E_1 from the initial value E_0.



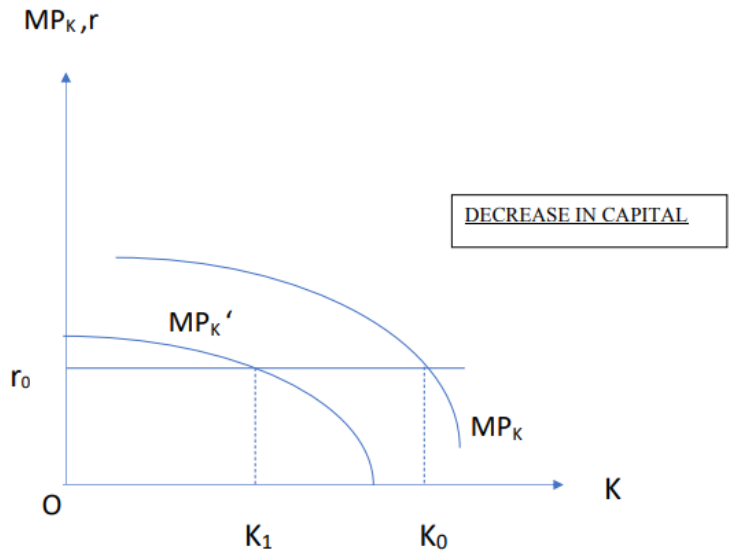
Decrease in emission leads to increase in labour productivity causing shift of MP_L curve to the right since

$$\frac{\partial Q_{jL_j}}{\partial E_j} < 0$$

So, the labour usage is increased from L_0 to L_1 thus leading to an increasing tendency to output. Though in reality such changes don't take place in the very short period of time. Moreover, with modern technologies and energy intensive industries the downward trend on output is more.



Decrease in emission leads to decrease in the level of capital from K_0 to K_1 since our assumption is $\frac{\partial Q_{jK_j}}{\partial E_j} < 0$



Since the labour is increasing and capital and emission level are decreasing, so in reality the change in output depends on the magnitude of the relative change.

Section-II

II.1 Construction of SAM

A social accounting matrix represents the transaction flows of an entire economy and its activities by different agents in a particular year, where the columns represent the outflows and the rows represent the inflows to the economy. It thus forms our base of the analysis presented over here.

First, we provide the basic structure of a SAM on the basis of description given in Pradhan et al.,2006.

	Production	factor	household	private	government	indirect taxes	capital account	rest of world
production	input output table		private consumption		government consumption		investment	exports
Factor	value added							net factor income
household		value added income			government transfers, interest on debt			net current transfers
private		operating profits			interest on debt			
government		income from enterprises	income and wealth taxes	corporate taxes		total indirect taxes		net capital transfers
indirect taxes	taxes on intermediates		taxes on purchases		taxes on purchases		taxes on investment goods	taxes on exports
capital account		depreciation	household savings	corporate savings	government savings			foreign savings
rest of world	imports							

We have constructed the SAM of year 2007-08 to analyse the effect of different policies on the economy. The different components of the SAM and their sources can be mentioned as follows:

1. **Input Output Table** – Input output table establishes the sale-purchase relationship in an economy. We have obtained the input output table which is a commodity×commodity table from the MOSPI. The MOSPI provides the input output table for 130 sectors in a detailed manner. For our analysis, we have aggregated those 130 sectors into 5 broad sectors maintaining some similar characteristics among them. The aggregation scheme was made on the basis of data of emissions of CO_2 as given below.

SERIAL NO	SECTOR CODE	SECTORS FOR SAM	SECTORS OF IO TABLE
1	AGRI	AGRICULTURE, PISCICULTURE AND FORESTRY	1-26,67
2	FUEL	FUGITIVE, MINING AND MINERALS	27-37,63,64,74,76
3	CHEM	CHEMICALS, FOOD PROCESSING AND OTHER CHEMICAL MATERIALS	38-62,65,66,68-73,75,107
4	MET	METALS AND MACHINERY	77-105
5	OTH	TRANSPORT AND ALL OTHER SERVICES	106,108,109-130

We performed the aggregation procedure for the input output table by matrix multiplication method. The process is - A*=SAS' where A* is the new aggregated input output table we formed. S is the aggregation matrix whose elements are s_{ij} where s_{ij} is 1 if the particular sector is included within the aggregated sector and 0 if not. S′ is the transpose matrix of S. A is the initial matrix obtained from the MOSPI website. This aggregated input output table forms the backbone of SAM.

2. **Value Added Income Of Labour And Capital**– Gross value added of each sector is obtained from the input output table itself. The aggregation has followed the same method as mentioned above. Now to decompose in into labour and capital, first we estimated the net value added of each sector by subtracting the rate of depreciation from gross value added of that sector. Depreciation of each sector is estimated from the ratio of gross value added and depreciation of each sector. We obtain the wage and non-wage income from the National Account Statistics.
   Then we add the non-wage income obtained along with the total depreciation to estimate the total value added of capital.

3. **Other Income Accounts**– Income from enterprises of Government sector which include the Government administration as well as public sector units and non-departmental firms, have been obtained from the National Accounts of Statistics, Government of India of 2007-08. Operating profits by different private firms are added as a balancing item of the SAM.

4. **Tax And Savings Account**– Data on personal taxes by households includes Income and Wealth tax obtained from households. Data is obtained from the NAS of India of 2007-08. Data on Corporate taxes by corporate private firms is retrieved in the same way. Input output table provides the Net Indirect Taxes sector wise. Thus, these indirect taxes are net of subsidies and cover all kinds of production taxes. Indirect tax like sales tax, VAT etc. on Consumption, Investment, Government final purchase and Exports are also provided by Input output table.

   On the other hand, Household savings, Total Government savings and Corporate savings are obtained from NAS.

5. **Final Demand Account**– The final demand by two agents- households and government are obtained from input output table. Taxes on such purchases and total investment expenditure are also obtained from the same source while the Depreciation data is obtained from NAS.

6. **Foreign Account**– The column of ROW includes the exports and the row of ROW includes the imports of different sectors obtained from the input output table. Net factor income for both labour and capital, net current transfers to household and net capital transfer to government are obtained from the National Accounts Statistics. Foreign savings has been added as a balancing item.

   Finally, we present the SAM computed for India for the year 2007-08.

	AGRI	FUEL	CHEM	MET	OTH	LAB	CAP	HOH	PVT	GOV	IDT	CAC	ROW	TOTAL
AGRI	2893 2784 .52	53033 0.0382	24366 562.59	16463 5.5118	105374 53.45			64648 867.09		10043 09.592		488714 .1261	281513 8.676	133488 795.6
FUEL	2349 710.9 73	34330 246.43	838841 6.572	10848 000.81	24983 418.22			10528 499.77		831389 .0431		375150 6.013	129081 14.62	108919 302.5
CHEM	4132 677.6 06	28324 35.463	477361 73.48	744813 5.91	250877 03.38			520221 78.33		35726 66.334		12089 383.35	176583 15.29	172579 669.1

MET	602281.961	1320876.807	3758124.46	640911848.28	27336470			10427342.77		1806151.531		6996636.29	15764770.12	195076502.2
OTH	11793709.54	5953067.069	3408328 5.78	2847696.3	8324880.16			13555505.4		4294351.34		9654840.72	4667997.95	4852847 84.2
LAB	41400931.87	5139409.811	1392875 6.37	1162271 9.67	1305584 24.3								-2276 00	2024226 42
CAP	43955072.22	1655664 7.79	2545383 5.93	1772092 9.29	1518055 08.5								-1884 000	2536079 93.7
HOH						2024226 42	1595215 55			2824945 6			1019430 0.38	4003879 53.4
PVT							1347993 8.73			4895541				6243547 9.73
GOV							3113690 0	1007625 3.05	1927656		4050493		6222249 5	1632127 97.1
IDT	-35058 06.26	2493784 .358	2370340 .004	7406420 .27	1086182 5.68			5105207		1140232		7349727	7278763	4050049 3.05
CAC							4946960 0	1120221 00	4315882 3.7	3470570 0			-4916341 6.82	1901928 06.9
ROW	38274 33.169	3976250 4.23	1249417 3.96	4729686 6.26	2086590 0.59									1242468 78.2
TOTAL	13348879 5.6	1089193 02	1725796 69.1	1950765 02.3	4852847 84.3	2024226 42	2536077 993.7	4003879 53.4	6243547 9.7	1632127 96.8	4050493	1901928 07.5	1242468 78.2	

II.2 CGE Model

CGE or computable general equilibrium models are defined on the basis of certain equations describing the production frontier of factor usage in the production process. It can be used to simulate different policies showing how different sectors of the economy react. We have used GAMS win64 28.2.0 software for the calibration and simulation purpose in both the simulations performed.

Different modules of CGE model are

1. **Production Module**- Production module consists of the 5 broad sectors. In the second simulation we have included an additional sector, Abatement sector which describes the cleaning activity of wastewater in the economy. The production process in the model is described by multistage nested production functions. As in the real-world economy in this model we specify production process takes place by transforming intermediate inputs by different factors used to desired output using a given level of technology. Final production function aggregates different inputs and factors. Other than that, we have specified the intermediate demand functions and factor demand functions separately. Carbon emissions are also added in the functions to note the fact of pollution permit a firm gets from authority (or Government). The intermediate demand functions are given by equation 3 according to the input output co-efficient and output produced from j^{th} sector. The input output coefficients are calibrated in the calibration section from the given ESAM.

   Factor demands are described by three equations in each simulation which also include the emissions requirements or can be interpreted as pollution permits. Thus, the

production sector gets connected with environmental factors. We have neglected carbon tax here as studies have been made regarding them, also in 2007 there was no carbon tax in India.

Unit cost function has been described by the total cost of intermediate demand and total cost of factor demand.

2. **Government Module**- This module just describes the receipts and outlays of the government. Government receives taxes from different sources as total indirect tax, direct taxes from household and private enterprises which serve as income of the Government. Government final consumption are also described equation 9 in both the simulations.

   Equation 6 represents the direct tax paid by household and equation 7 represents corporate tax paid by private enterprises. We have calibrated for the both the simulations the few required parameters from the constructed ESAM. In case of government the calibrated parameters are direct tax rates for household and private enterprises as these will be necessary for framing equations. Other parameters estimated from the demand side of government behaviour are government's share for total consumption and government's propensity to save.

3. **Household Module**- Here we explain two-stage consumption analysis. Sources of income for the household are factor endowments from labour and capital, transfer payments from government and net current transfer payments from the rest of the world. First, we specify a household demand function. Next, we use a utility function as shown in equation 27 which is a function of consumption levels for each sector. Income of household is given in the bracketed portion of the equations. For that purpose, we have calibrated the required share parameter of the utility function which measures the constant income or budget share for the household from the ESAM in both the cases. We assume a Cobb Douglas utility function with fixed share parameter.

4. **Savings-Investment Module**- This module has primarily three equations of total savings by the three agents of the model viz, Household, Government and Private enterprises. Savings propensity is calibrated in both the simulations. Equations 11,12,13 give the savings functions in both the simulations. Investment behaviour of the economy i.e., investment demand function is given by equation 10. Total investment is basically, the sum of the change in stocks and gross capital formation though the separate accounts are not shown in SAM and are accounted in the similar fashion. The Savings Investment identity holds in this case as well.

5. **International Trade Module** - This module characterizes the open economy nature of the Indian economy which is studied in this analysis. The Armington function combines the domestic demand function and the import demand function. Thus it combines both produced goods within and outside the economy. It also specifies that both the goods are not perfect substitutes, rather imperfect substitutes. The functional form is of CES type gives a constant elasticity of substitution. Thus, a CES aggregation function is used to aggregate the demand side. The parameters of the Armington function i.e., share parameters of domestic and import demand and shift parameters are estimated by calibration for the both the simulations.

The Import demand function is given by equation 19. This equation actually gives the ratio of import consumption obtained from the Armington composite demand function multiplied with the total Armington composite demand.
This is the demand side of the economy with foreign elements.
Coming to supply side, the transformation function combines the goods which are supplied to or for domestic consumption and goods exported for consumption to the rest of the world which is given in equation 21. Thus, it combines the domestic supply function and export supply function. The aggregation function used is a CET or constant elasticity of transformation function. The different shift and share parameters required for framing the equation are calibrated from data of the ESAM in both cases.

The Export supply function gives the ratio of the exports of the total supply from the transformation function multiplied by the total supply obtained from the transformation function. Thus, it gives the total supply of exports from the rest of the world.

The Balance of Payments is given by equation 17 which maintains the foreign exchange market. Here total foreign exchange receipts or supply is determined by net current transfer payments and net capital transfer, exports and net factor income from abroad. Total demand of foreign exchange receipts is given by imports. This determines equilibrium in international trade sector.

6. **Domestic Module**– Here we specify the domestic demand and supply equations. Domestic demand is given by equation 20 in the similar way as import demand by determining the ratio of it from the Armington function and then multiplying total demand (Q) to it.

   Domestic supply is also determined in the similar way by determining the ratio from the transformation function and then multiplying it with total supply obtained from transformation function in equation 22.

7. **Macro Closure Module**– This module specifies the equilibrium of different markets of the model thus making the model a general equilibrium one. The foreign exchange or BOP equation is already described in the international trade module. The product market equilibrium is given in equation in 24. In this case we have total demand and supply of composite good taking both the domestic and foreign elements. Total demand (Q) is determined by total intermediate demand, consumption expenditure, investment expenditure and government final consumption expenditure.

   Factor market equilibrium for both labour and capital are given by equation 25. Here total factor endowment of household, total factor endowment of government and private enterprises and net factor income from abroad determine the total supply of labour. Total labour demand is given by the earnings from all the sectors of the economy and both demand and supply equalize to maintain factor market equilibrium.

8. **Emission Module** – This is an extension of the traditional modules to incorporate environmental factors. We have already taken into account the pollution permit or emissions the firm in the production module. Here in equation 26 in Simulation I we have noted the change in carbon dioxide emissions. In Simulation II we have noted the change in COD emissions for the water pollution module in equation 26.

II.3 Environmentally Extended SAM

We provide the scheme of the environmentally extended SAM.

	production	factor	household	private	government	indirect taxes	capital account	rest of world	emission
production	input output table		private consumption		government consumption		investment	exports	production emission
factor	value added							net factor income	
household		value added income			government transfers, interest on debt			net current transfers	
private		operating profits			interest on debt				
government		income from enterprises	income and wealth taxes	corporate taxes		total indirect taxes		net capital transfers	
indirect taxes	taxes on intermediates		taxes on purchases		taxes on purchases		taxes on investment goods	taxes on exports	
capital account		depreciation	household savings	corporate savings	government savings			foreign savings	
rest of world	imports								
emission	removal								

Section III
First Simulation

The first problem which is addressed is air pollution.
We perform the simulation for a 50 % decrease in emissions of the GHG gases by different industries. The base period taken in our analysis is 2007-08 SAM. We have considered a Standard CGE model in this case which is a static model and provides a one period solution of the simulation. Such a measure must have a negative impact on the output of different sectors. We have to see by how much such changes affect and which of the sectors are getting affected. Kyoto protocol and many UN environment programmes have concentrated to emission reduction programmes. However, there is a scary outlook for firms to switch over carbon neutral fuels which may increase their costs because reducing fuel may increase costs and thus lesser profits and may even lead to lesser output. We include the total emissions of GHG gases in the environmental SAM for different sectors. The data is obtained from INCAA report.

	AGRI	FUEL	CHEM	MET	OTH	LAB	CAP	HOH	PVT	GOV	IDT	CAC	ROW	TOTAL	CO
AGRI	28932784.5	5303 30.0382	24366562.59	164635.511	10537453.45			6464 8867.09		1004309.592		48871 4.1261	28151 38.676	13348 8795.6	519255.5

	2			8											
FUEL	2349710.973	34330246.43	8388416.572	10848000.81	24983418.22			10528499.77		831389.0431		3751506.013	12908114.62	1089193025	196476
CHEM	4132677.606	2832435.463	4773617 3.48	7448135.91	25087703.38			52022178.33		3572666.334		1208938 3.35	17658315.29	1725796691	917555.3
MET	602281.961	1320876.807	3758124.46	64091848.28	27336470			10427342.77		1806151.531		699686 36.29	15764770.12	1950765022	122736.9
OTH	11793709.54	5953067.069	3408328 5.78	28476946.3	83248080.16			135557505.4		429473 51.34		965448 40.72	46679997.95	4852847842	371879
LAB	41400931.87	5139409.811	1392875 6.37	11622719.67	130558424.3								-227600	2024226422	
CAP	43955072.22	1655664 7.79	2545383 5.93	17720929.29	151805508.5								-1884000	253607993.7	
HOH						202422642	159521555			282494 56			10194300.38	400387953.4	
PVT							13479938.73			48955541				62435479.73	
GOV							31136900	10076253.05	19276656		40500493		6222 2495	16321 2797.1	
IDT	-3505806.26	2493784.358	2370340.004	7406420.27	10861825.68			5105207		1140232		7349727	7278763	40500493.05	
CAC							49469600	11202 2100	43158823.7	34705700			-4916 3416.82	190192806.9	
ROW	3827433.169	3976 2504.23	1249417 3.96	47296866.26	20865900.59									124246878.2	
TOTAL	133488795.6	1089193302	1725796691	195076502.3	48528478 4.3	202422642	253607993.7	40038795 3.4	62435479.7	16321 2796.8	40500493	19019 2807.5	1242 4687 8.2		
CO	275358	0	0	0	0										

We have considered 5 sectors as given in our SAM, three agents viz. household, private sector (corporate) and government. The two inputs used in production are capital and labour. So, the four sets are

Sectors	AGRI, FUEL, CHEM, MET, OTH	Factors	LAB, CAP
Emission	CO	Agents	HOH, PVT, GOV

III.1 Calibration

The parameters calibrated from the base SAM in this model are given in the following table.

	share parameter in utility function	$\gamma(i)$	scale parameter in Armington

$\alpha(i)$			function
$\beta(h,j)$	share parameter in production function	$\psi d(i)$	share parameter in transformation function
b(j)	scale parameter in production function	$\psi e(i)$	share parameter in transformation function
ax(i,j)	intermediate input requirement coefficient	$\theta(i)$	scale parameter in transformation function
ay(j)	composite factor input requirement coefficient	ssh	average propensity for household saving
$\mu(i)$	government consumption share	ssp	average propensity for private saving
$\lambda(i)$	investment demand share	ssg	average propensity for govt saving
$\delta m(i)$	share parameter in Armington function	τd	direct tax rate
do(i)	share parameter in Armington function	τc	corporate tax rate

Next, we obtain the **elasticity parameters**.

σ_i 'elasticity of substitution' = 2

ψ_i 'elasticity of transformation' = 2

η_i 'substitution elasticity parameter' = $(\sigma_i - 1)/\sigma_i = 0.5$

φ_i `transformation elasticity parameter' = $(\psi_i + 1)/\psi_i = 1.5$

III.2 Variables

The endogenous variables used in this model are

Y_j	composite factor of j-th firm	Sf	foreign saving
$F_{h,j}$	the h-th factor input by the j-th firm	Td	direct tax
$X_{i,j}$	intermediate input	Tc	corporate tax
Z_j	output of the j-th good	Tz_j	production tax
E_i	exports	Tph	tax on purchase of household
M_i	imports	Tpg	tax on purchase of government
Q_i	Armington's composite good	Ti	tax on investment goods
D_i	domestic good	Te	tax on exports
pf_h	the h-th factor price	Ig	income from enterprises
py_j	composite factor price	Op	operating profit
pz_j	supply price of the j-th good	Gt	government transfers
pq_i	Armington's composite good price	Id	interest on debt
pe_i	export price in local currency	Nf	net factor income
pm_i	import price in local currency	Nct	net capital transfer to government

pd_i	the i-th domestic good price	Nc	net current transfer
ε	exchange rate	De	depreciation rate
Sh	household saving	Co_i	CO2 emission
Sp	private saving	dCOi	change in CO2 emission
Sg	government saving	UU	utility [fictitious]

III.3 Equations

1. eqpy(j) 'composite factor agg. func.'

$$Y_j - CO_j = b_j * \prod_h F_{h,j}^{\beta_{h,j}}$$

2. eqF(h,j) 'factor demand function'

$$F_{h,j} = \beta_{h,j} * py_j * Y_j / pf_h$$

3. eqX(i,j) 'intermediate demand function'

$$X_{i,j} = ax_{i,j} * Z_j$$

4. eqY(j) 'composite factor demand function'

$$Y_j - CO_j = ay_j * Z_j$$

5. eqpzs(j) 'unit cost function'

$$pz_j = ay_j * py_j + \sum_i (ax_{i,j} * pq_i)$$

6. eqTd 'direct tax revenue function'

$$Td = \tau d * \sum_h (pf_h * FF_h)$$

7. eqTc 'corporate tax function'

$$Tc = \tau c * (\sum_h (pf_h * Op_h) + Id)$$

8. eqTz(j) 'production tax revenue function'

$$Tz_j = \tau z_j * pz_j * Z_j$$

9. eqXg(i) 'government demand function'

$$Xg_i = \mu_i * (Td + Tc + \sum_h (pf_h * Ig_h) + \sum_j Tz_j + Nct - Sg - Tpg)/pq_i$$

10. eqXv(i) 'investment demand function'

$$Xv_i = \lambda_i * (Sh + Sp + Sg + \varepsilon * Sf - De - Ti)/pq_i$$

11. eqSh 'household saving function'

$$Sh = ssh * (\sum_h (pf_h * FF_h) + \sum_h (pf_h * Nf_h))$$

12. eqSg 'government saving function'

$$Sg = ssg * (Td + Tc + \sum_h (pf_h * Ig_h) + Nct + \sum_j Tz_j)$$

13. eqSp 'private saving function'

$$Sp = ssp * (\sum_h (pf_h * Op_h) + Id)$$

14. eqXp(i) 'household demand function'

$$Xp_i = \alpha_i * ((\sum_h (pf_h * FF_h) + \sum_h (pf_h * Nf_h) - Sh - Tph - Td)/pq_i$$

15. eqpe(i) 'world export price equation'

$$pe_i = \varepsilon * pWe_i$$

16. eqpm(i) 'world import price equation'

$$pm_i = \varepsilon * pWm_i$$

17. eqepsilon 'balance of payments'

$$\sum_i pWe_i * E_i + Sf = \sum_i pWm_i * E_i$$

18. eqpqs(i) 'Armington function'

$$Q_i = \gamma_i * (\delta m_i * M_i^{\eta_i} + \delta d_i * D_i^{\eta_i})^{(\frac{1}{\eta_i})}$$

19. eqM(i) 'import demand function'

$$M_i = (\gamma_i^{\eta_i} * \delta m_i * pq_i/pm_i^{(1/(1-\eta_i))} * Q_i)$$

20. eqD(i) 'domestic good demand function'

$$D_i = (\gamma_i^{\eta_i} * \delta d_i * pq_i/pd_i^{(1/(1-\eta_i))} * Q_i)$$

21. eqpzd(i) 'transformation function'

$$Z_i = \theta_i * (\xi e_i * E_i^{\varphi_i} + \xi d_i * D_i^{\varphi_i})^{(1/\varphi_i)}$$

22. eqDs(i) 'domestic good supply function'

$$D_i = (\theta_i^{\varphi_i} * \xi d_i * (1 + \tau z_i) * pz_i/pd_i)^{(1/(1-\varphi_i))} * Z_i$$

23. eqE(i) 'export supply function'

$$E_i = (\theta_i^{\varphi_i} * \xi e_i * (1 + \tau z_i) * pz_i/pe_i)^{(1/(1-\varphi_i))} * Z_i$$

24. eqpqd(i) 'market clearing cond. for comp. good'

$$Q_i = Xp_i + Xg_i + Xv_i + \sum_j X_{i,j}$$

25. eqpf(h) 'factor market clearing condition'

$$\sum_j F_{h,j} + Nf_h = FF_h + Op_h + Ig_h$$

26. eqdCO(i) 'change in CO2 emission function'

$$dCO_i = (CO_i / CO0_i - 1) * 100$$

27. obj 'utility function [fictitious]'

$$UU = \prod_i (Xp_i * \alpha_i)$$

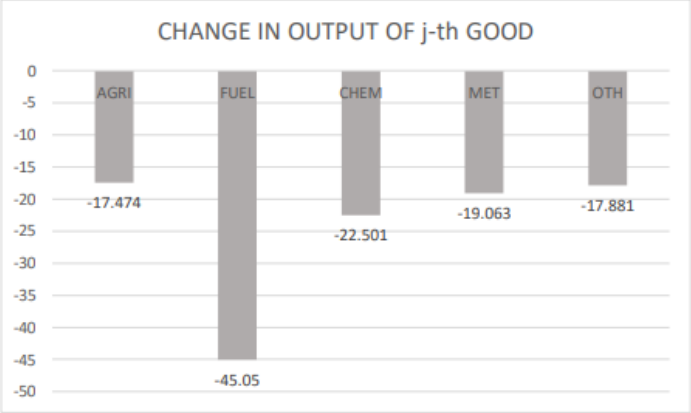
III.4 Results

The simulation provides results which goes with the economic logic and the model presented above. All the results are shown in tabular and graphical form. We show the changes for all the variables for all the sectors.

1. **Change in output-**
   Output of all the sectors are adversely affected with the policy. The most affected industry will be fuel. Fuel consists of all kinds of fugitive sources of emissions like coal

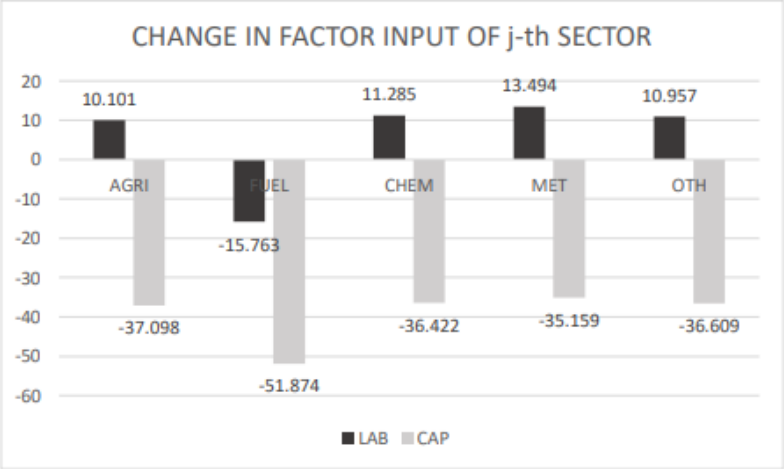
and petroleum mining etc. Thus, the output of the major primary source of carbon emission gets reduced. Hence, there will be an impetus for the economy if such restrictions are imposed over carbon emission to switch over to renewable sources

dZ		
	AGRI	-17.474
	FUEL	-45.05
	CHEM	-22.501
	MET	-19.063
	OTH	-17.881



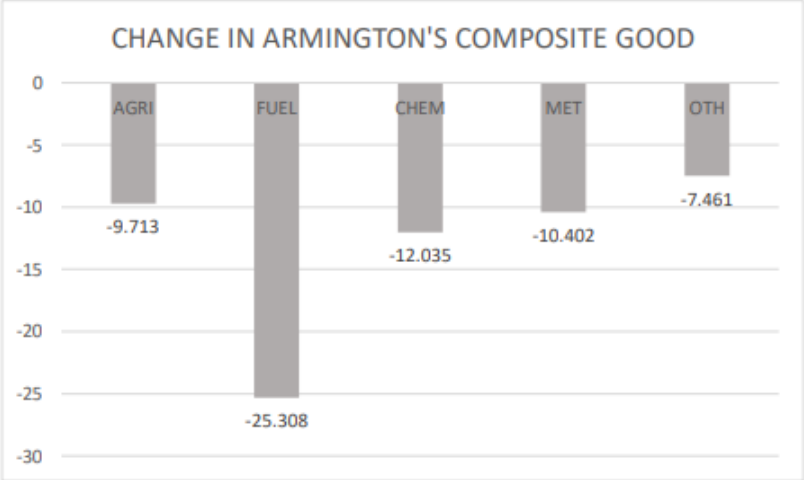
2. **Change in factor inputs**- There is a labour capital substitution which can be readily seen from the table and the graph, because labour for each sector except fuel increases after the implementation of the policy while capital input has decreased. So, we cannot say such a policy will lead to decrease in employment. But in actual economy with such high output fall, there may be fall in investment and other things.

dF		LAB	CAP
	AGRI	10.101	-37.098
	FUEL	-15.763	-51.874
	CHEM	11.285	-36.422
	MET	13.494	-35.159
	OTH	10.957	-36.609



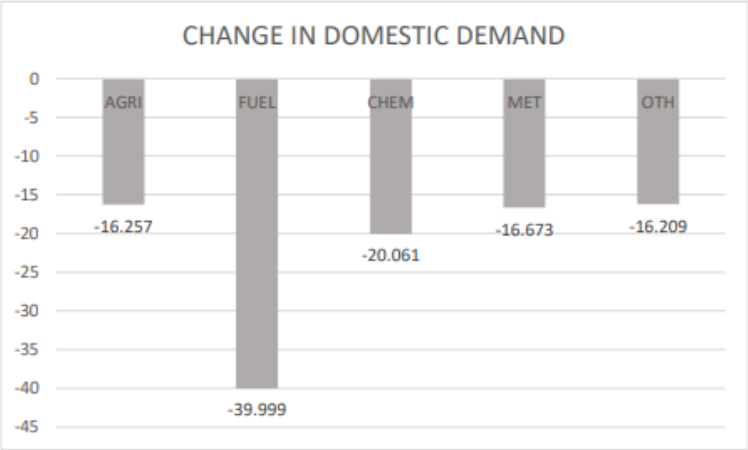
3. **Change in Armington's Composite good**– We see a negative change in the total demand of the Armington's Composite good for all the sectors, which implies fall in both domestic and export demand.

dQ		
	AGRI	-9.713
	FUEL	-25.308
	CHEM	-12.035
	MET	-10.402
	OTH	-7.461



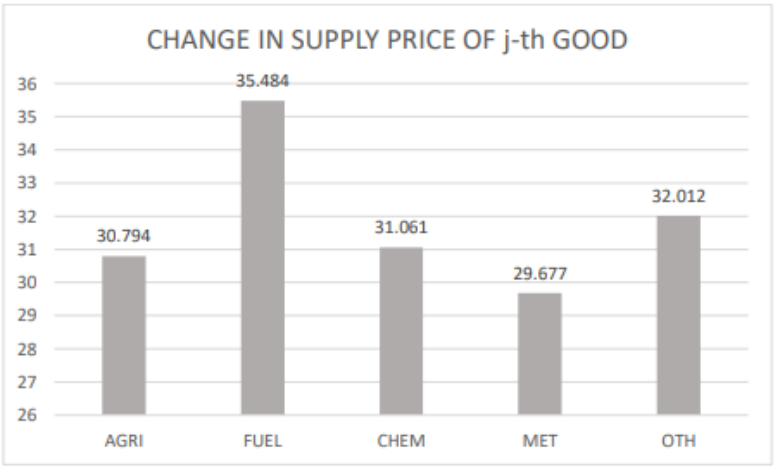
4. **Change in domestic demand**- We observe adverse effect on the domestic demand for each sector.

dD		
	AGRI	-16.257
	FUEL	-39.999
	CHEM	-20.061
	MET	-16.673
	OTH	-16.209



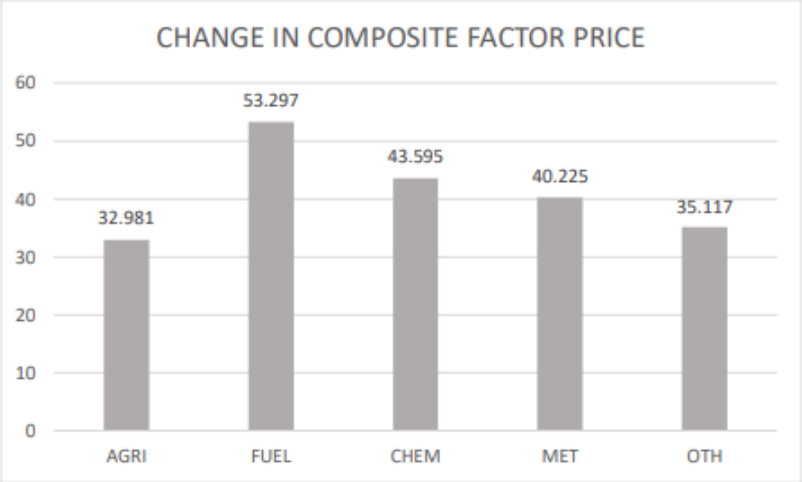
5. **Change in supply price of j^{th} good** -A target reduction in emission leads to an increase in fuel prices due to constrained supply and also it leads to constraints in the production process. As the output shortage occurs, we witness increase in prices of the goods.

dpz		
	AGRI	30.794
	FUEL	35.484
	CHEM	31.061
	MET	29.677
	OTH	32.012



6. **Change in price of composite factor input** - Here we show how the simulation resulted in increase in prices of all goods. The same picture can be seen in factor prices as well.

dpy		
	AGRI	32.981
	FUEL	53.297
	CHEM	43.595
	MET	40.225
	OTH	35.117



7. Having considered the price of labour to be unity, i.e, the labour to be numeraire, the **change in price of capital is given by dpf= 75.036.**

Section-IV
Simulation II

IV.1 New ESAM

The first simulation was done on the basis of inclusion of GHG emissions of different sectors. But another side of pollution is water pollution which leads to increase in pollutants due to discharge of effluents by industries. In India, data on water pollution for different sectors are not available rather we have data on how much different rivers are polluted or available data is on state wise. Since our approach of simulation is a sectoral approach based on SAM, we couldn't use that data. D. Chakroborty and K. Mukhopadhay in their 'Water Pollution and Abatement Policy in India' have given estimates of Chemical Oxygen Demand (COD) of different industries, which we have used to build the extended SAM-ESAM.

In India we have different effluent treatment plants as well though most of them are operating below capacity. By a selective study by CPCB the operational capacity of STPs in Delhi is 64%. Thus, most of the wastes are not treated in India. So, we have added an Abatement sector which plays an important role in controlling pollution and contributes to greener economy. Data on STPs also is available on CPCB website state wise. Chakroborty et al also provides estimates on cost of such treatment plants sector wise. It also provides estimates on labour costs which we have used for computing the value added of labour and other intermediate costs for inputs.

We have performed the simulation on reduction of COD emission by 50%.

	AGRI	FUEL	CHEM	MET	OTH	ABT	LAB	CAP	HOH	PVT	GOV	IDT	CAC	ROW	TOTAL	COD
AGRI	28932784.52	530330.0382	2436662.59	164635.5118	105374 53.45	0			64648867.09		1004310		488714.1	2815138.676	13348 8795.6	898 57.25

FUEL	2349710.973	34330246.43	8388416.572	10848000.81	24983418.22	0			10528499.77		831389		3751506	12908114.62	1089193029.5	251.63
CHEM	4132677.606	283243 5.463	47736173.48	74481359.91	25087703.38	3919335			5202217.33		3572666		12089383	17658315.29	1764990041	28703.38
MET	602281.961	1320876.807	3758124.46	64091848.28	27336470	0			10427342.77		1806152		69968636	15764770.12	1950765022	1152.03
OTH	11793709.54	595306 7.069	34083285.78	28476946.3	83248080.16	0			135557505.4		4294735 1		96544841	46679997.95	485284784.2	0
ABT	142876.84	23087.47	4743103.61	123702.8	0	0			22702133 1		42105874		1.4E+08	91506422	505682013.7	0
LAB	41329493.45	5127866.305	13516872.06	11560868.23	13055842 4.3	131731058.6								-227600	333596982.9	
CAP	43883633.8	16545104.29	25041951.62	17659077.84	15180550 8.5	263462117.1								-18840000	516513393.2	
HOH							333596982.9	290974254.7			28249456			10194300.38	663014994	
PVT							0	144932638.4			48955541				193888179.4	
GOV							0	3113690 0	1007625 3.05	19276656		40500493		104328368.8	205318670.9	
IDT	-350580 6.264	24937843.358	2370340.004	74064202.27	10861825.68	0			5105207		1140232		7349727	7278763	40500493.05	
CAC								49469600	147627809.6	1.75E+08	34705700			-76206209.51	330208423.5	
ROW	382743 3.169	39762504.23	12494173.96	47296866.26	20865900.59	106569503									230816381.2	
TOTAL	133488795.6	1089193025	1764990041	19507607 6502.2	48528478 4.2	505682013.7	333596982.9	516513393.2	663014994	1.94E+08	2.05E+08	40500493	3.3E+08	23081636 81.2		
COD	0	0	0	0	0	0										

We have considered 6 sectors as given in our SAM, three agents viz. household, private sector (corporate) and government. The two inputs used in production are capital and labour.

So, the four sets are

Sectors	AGRI, FUEL, CHEM, MET, OTH, ABT	Factors	LAB, CAP
Emission	COD	Agents	HOH, PVT, GOV

IV.2 Calibration

The parameters calibrated in this model and the equations used for those calibrations remain the same as earlier simulation.

The calibrated values are-

Scale and share parameter

		AGRI	FUEL	CHEM	MET	OTH	ABT
α_i		0.129	0.021	0.104	0.021	0.271	0.454
β_{hj}	LAB	0.485	0.237	0.351	0.396	0.462	0.333
	CAP	0.515	0.763	0.649	0.604	0.538	0.667
b_j		1.999	1.728	1.911	1.957	1.994	1.89
ay_j		0.64	0.325	0.239	0.208	0.623	0.99
μ_i		0.005	0.004	0.017	0.009	0.209	0.205
λ_i		0.001	0.009	0.03	0.172	0.238	0.345
δm_i		0.148	0.457	0.226	0.374	0.183	0.371
δd_i		0.852	0.543	0.774	0.626	0.817	0.629
γ_i		1.337	1.985	1.538	1.881	1.426	1.874
ξe_i		0.87	0.676	0.742	0.743	0.749	0.647
ξd_i		0.13	0.324	0.258	0.257	0.251	0.353
θ_i		4.039	2.19	2.527	2.441	2.546	2.184

Intermediate input requirement coefficient

ax_{ij}		AGRI	FUEL	CHEM	MET	OTH	ABT
	AGRI	2.89E+07	530330	2.44E+07	164635.5	1.05E+07	0
	FUEL	2349711	3.43E+07	8388417	1.08E+07	2.50E+07	0
	CHEM	4132678	2832435	4.77E+07	7448136	2.51E+07	3919335
	MET	602282	1320877	3758124	6.41E+07	2.73E+07	0
	OTH	1.18E+07	5953067	3.41E+07	2.85E+07	8.32E+07	0
	ABT	142877	2308 7.47	4743104	1237028	0	0

Average propensity of savings and tax rates

ssh	0.223
ssp	0.901
ssg	0.188
τd	0.016
τc	0.099

IV.3 Varibles

The endogenous variables used in this model remain the same as the earlier simulation except

CoD_i	COD emission
dCODi	change in COD emission

IV.4 Equations

1. eqpy(j) 'composite factor agg. func.'

$$Y_j - COD_j = b_j * \prod_h F_{h,j}^{\beta_{h,j}}$$

2. eqF(h,j) 'factor demand function'

$$F_{h,j} = \beta_{h,j} * py_j * Y_j / pf_h$$

3. eqX(i,j) 'intermediate demand function'

$$X_{i,j} = ax_{i,j} * Z_j$$

4. eqY(j) 'composite factor demand function'

$$Y_j - COD_j = ay_j * Z_j$$

5. eqpzs(j) 'unit cost function'

$$pz_j = ay_j * py_j + \sum_i (ax_{i,j} * pq_i)$$

6. eqTd 'direct tax revenue function'

$$Td = \tau d * \sum_h (pf_h * FF_h)$$

7. eqTc 'corporate tax function'

$$Tc = \tau c * (\sum_h (pf_h * Op_h) + Id)$$

8. eqTz(j) 'production tax revenue function'

$$Tz_j = \tau z_j * pz_j * Z_j$$

9. eqXg(i) 'government demand function'

$$Xg_i = \mu_i * (Td + Tc + \sum_h (pf_h * Ig_h) + \sum_j Tz_j + Nct - Sg - Tpg)/pq_i$$

10. eqXv(i) 'investment demand function'

$$Xv_i = \lambda_i * (Sh + Sp + Sg + \varepsilon * Sf - De - Ti)/pq_i$$

11. eqSh 'household saving function'

$$Sh = ssh * (\sum_h (pf_h * FF_h) + \sum_h (pf_h * Nf_h))$$

12. eqSg 'government saving function'

$$Sg = ssg * (Td + Tc + \sum_h (pf_h * Ig_h) + Nct + \sum_j Tz_j)$$

13. eqSp 'private saving function'

$$Sp = ssp * (\sum_h (pf_h * Op_h) + Id)$$

14. eqXp(i) 'household demand function'

$$Xp_i = \alpha_i * ((\sum_h (pf_h * FF_h) + \sum_h (pf_h * Nf_h) - Sh - Tph - Td)/pq_i$$

15. eqpe(i) 'world export price equation'

$$pe_i = \varepsilon * pWe_i$$

16. eqpm(i) 'world import price equation'

$$pm_i = \varepsilon * pWm_i$$

17. eqepsilon 'balance of payments'

$$\sum_i pWe_i * E_i + Sf = \sum_i pWm_i * E_i$$

18. eqpqs(i) 'Armington function'

$$Q_i = \gamma_i * (\delta m_i * M_i^{\eta_i} + \delta d_i * D_i^{\eta_i})^{(\frac{1}{\eta_i})}$$

19. eqM(i) 'import demand function'

$$M_i = (\gamma_i^{\eta_i} * \delta m_i * pq_i/pm_i^{(1/(1-\eta_i))} * Q_i)$$

20. eqD(i) 'domestic good demand function'

$$D_i = (\gamma_i^{\eta_i} * \delta d_i * pq_i/pd_i^{(1/(1-\eta_i))} * Q_i)$$

21. eqpzd(i) 'transformation function'

$$Z_i = \theta_i * (\xi e_i * E_i^{\varphi_i} + \xi d_i * D_i^{\varphi_i})^{(1/\varphi_i)}$$

22. eqDs(i) 'domestic good supply function'

$$D_i = (\theta_i^{\varphi_i} * \xi d_i * (1 + \tau z_i) * pz_i/pd_i)^{(1/(1-\varphi_i))} * Z_i$$

23. eqE(i) 'export supply function'

$$E_i = (\theta_i^{\varphi_i} * \xi e_i * (1 + \tau z_i) * pz_i/pe_i)^{(1/(1-\varphi_i))} * Z_i$$

24. eqpqd(i) 'market clearing cond. for comp. good'

$$Q_i = Xp_i + Xg_i + Xv_i + \sum_j X_{i,j}$$

25. eqpf(h) 'factor market clearing condition'

$$\sum_j F_{h,j} + Nf_h = FF_h + Op_h + Ig_h$$

26. eqdCOD(i) 'change in COD emission function'

$$dCOD_i = (COD_i/COD0_i - 1) * 100$$

27. obj 'utility function [fictitious]'

$$UU = \prod_i (Xp_i * \alpha_i)$$

IV.5 Results

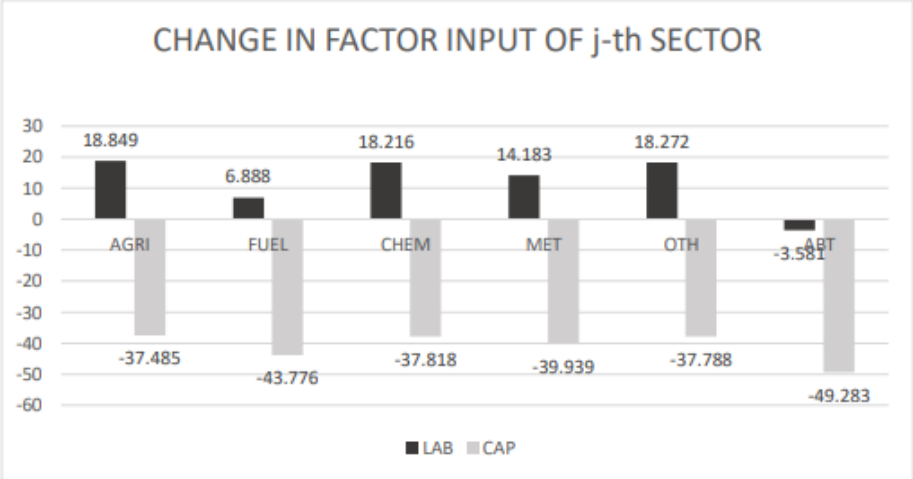
1. **Change in output**- We see fall in output for all sectors in this simulation.

dZ		
	AGRI	-14.629
	FUEL	-34.546
	CHEM	-22.111

	MET	-22.557
	OTH	-16.27
	ABT	-37.172

2. **Change in factor inputs-**

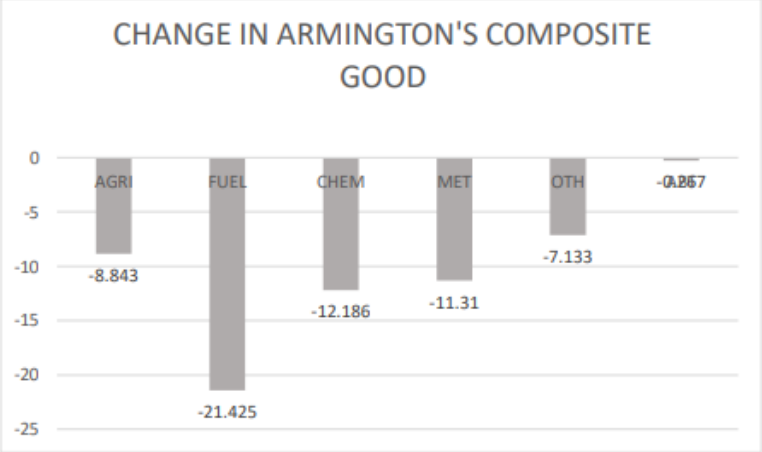
dF		LAB	CAP
	AGRI	18.849	-37.485
	FUEL	6.888	-43.776
	CHEM	18.216	-37.818
	MET	14.183	-39.939
	OTH	18.272	-37.788
	ABT	-3.581	-49.283



3. **Change in Armington's Composite good-**

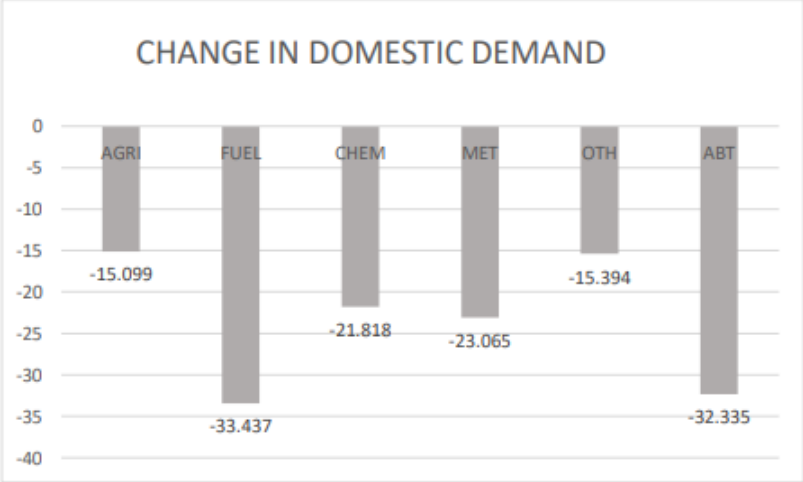
dQ		
	AGRI	-8.843
	FUEL	-21.425
	CHEM	-12.186
	MET	-11.31

	OTH	-7.133
	ABT	-0.267



4. **Change in domestic demand-**

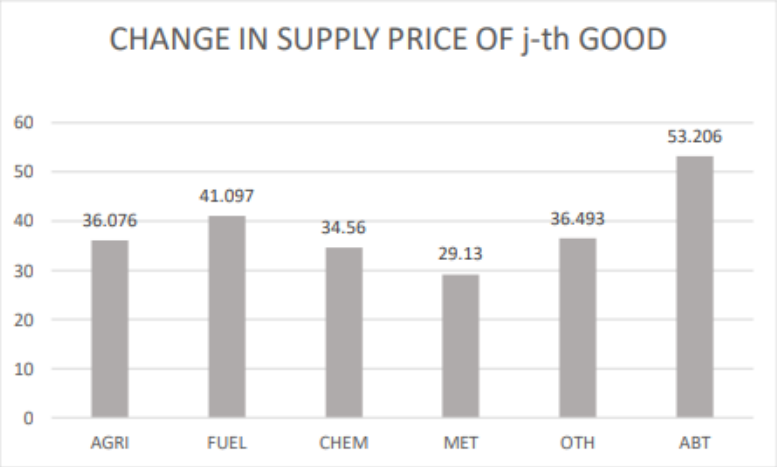
dD		
	AGRI	-15.099
	FUEL	-33.437
	CHEM	-21.818
	MET	-23.065
	OTH	-15.394
	ABT	-32.335



5. **Change in supply price of j^{th} good –**

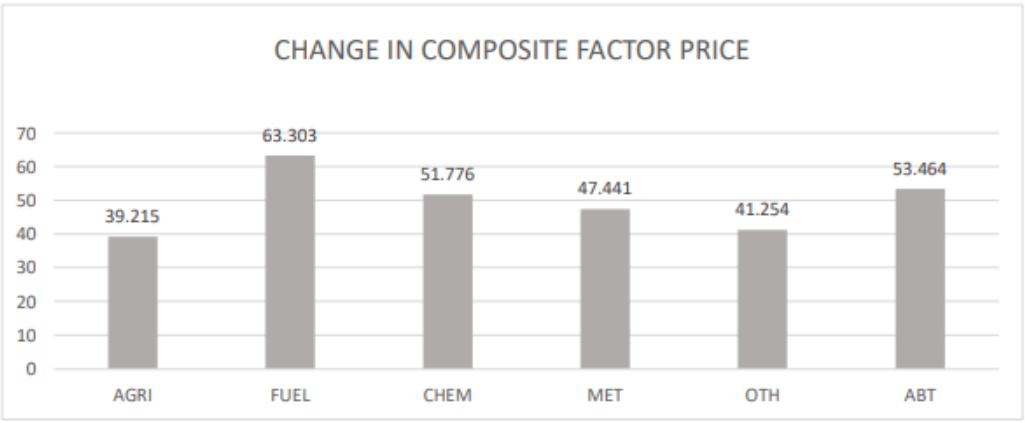
dpz		
	AGRI	36.076
	FUEL	41.097
	CHEM	34.56

	MET	29.13
	OTH	36.493
	ABT	53.206



6. **Change in price of composite factor input –**

dpy		
	AGRI	39.215
	FUEL	63.303
	CHEM	51.776
	MET	47.441
	OTH	41.254
	ABT	53.464



Section-V
Conclusion and Policy Prescription

As per our analysis emission targets on different industries leads to increase in prices and decrease in output. Output of all sectors have decreased as firms take carbon emissions as

full permit to increase their output as explained in our model. Prices of output and factors have increased. Domestic demand has decreased very much with decrease in output and increase in prices. The concerning issue is the increase in import demand which can lead to deficit in current account already a bigger problem for India. Such a policy if followed rigorously can lead to a stagflation scenario in the economy with more current account deficit and a big blow towards the growth process of the country. Thus, better policies can be change in technology and new better fuel. Now we used a Static CGE model to analyse the policy. The analysis on the data can be further simulated for dynamic models which may give different results and a better picture of how such policies will affect in the long run. Also, we haven't considered the inclusion of renewable energy substituting the coal energy which can be a better policy. India has been progressing a lot to substitute fossil fuel energy with solar energy. These polices can also be analysed using our database (can be extended) for future study.

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The Covid-19, Economic Crisis and Policy Retaliation: A Dynamic General Equilibrium Analysis.

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Abstract

This paper attempts to analyze the ceteris paribus effects of `supply chain disruptions', `strict government regulations', and `change in saving rate' on urban unemployment thereby identifying a pattern of labour migration, in the unprecedented `COVID' scenario. In doing this we use the Heckscher-Ohlin structure in a Harris-Todaro type economy, which has three sectors- a manufacturing sector, an agricultural sector and a skilled sector. We extend our representation to the long run by portraying a Solowian economy in which the accumulation of domestic capital stock plays a decisive role as a meter for unemployment and wage-disparity. Finally, we say that both in the short run as well as long run we see an unambiguous effect on inter-sectoral migration amongst the agricultural and the manufacturing sectors, thus also an unambiguous effect on unemployment which is counterproductive outcome of government's policy response.

JEL CLASSIFICATION: D50, E24, F2, F61, J6, O10.

Keywords: Covid-19, General Equilibrium, Migration, Unemployment.

Contents

1. Introduction:

Intramural migration is an indispensable and inevitable integrant of the economic and social life of a country. Migrants account for a floating and invisible citizen alternating between the origin and the destination areas and remaining on the fringe of the society. In today's world, extensive migration is a usual practice as the global acumen of individuals expands. The manoeuvre has been beneficial to both immigrants' importation and exportation nations. Internal migration customarily comes about from a rural area in the country to the urbanized area such as the country's capital. These migrants are often wondering for a better standard of living or employment opportunities. Empirical analysis reveals that the asymmetrical shift of people from one place to anotherresults in an adverse outcome.

Migration within a nation positively contributes to the destination's overall economy and development. Internal migration mainly causes due to economic purposes. Numerous individuals from the countryside proceed to their country's cities anticipating to earn more and bring their family upto a soaring standard of living. In large parts of our nation, there has been a humongous reverse migration due to COVID-19 pandemic. Thousands and thousands of labourers marched back to their villages for the sake of finding some warmth and empathy.

Census 2001 revealed that in India internal migrants account for as large as 309 million which was about 28% of the population. The data published by NSSO (2007-08) manifested a rise in internal migrants by 17 million in six years. The benefaction of migrants to the GDP of the Indian economy often goes unnoticed. The estimated data shows that migrants contribute around 10% of the country's GDP where almost 70% of the migrants being women. Census 2011 showed that the total number of internal migrants is 450 million which is approximately 35% higher than 2001 excluding child labor. West Bengal, Uttar Pradesh and Bihar have the highest number of migrants followed by Punjab, Rajasthan and Madhya Pradesh.

The sharp increase in migration over the years is due to the fact of the rapid urbanization of our cities and towns. 93% of India's total migrants get involved in the informal sector which includes seasonal or periodic migrant laborers in the Green Revolution.

Large scale migration persuaded by greater and greener pastures of economic progressiveness is a folk tale as most of the migration is for the subsistence and living and falls under the citatory of distress migration. Low threshold incomes perpetually force laborers for migration.

In the general context of the ongoing urbanization and rural industrialization, exploitation and utilization of labors take new conformation that is a combination and an ingenious adaption of the older forms of control and bondage contextualized to new conditions of capitalism. The foisting of the lockdown as a measure to contain the exponential growth thumped the unskilled and the semi-skilled migrant laborers the most. A rough estimate indicates that around 30 million migrants walked or were stranded in camps in their way back.

ILO estimates that around 400 million workers in the informal economy both unskilled and the semi-skilled will be falling in deeper into poverty during this crisis. The procedure for recuperation is going to be long-drawn out and throbbing for those migrants who would be looking for urban spaces.

2. Literature Survey:

A few theoretical models of rural-urban migration and the informal sector are available in the literature. Harris-Todaro (1970) exhibits rural-urban migration in a dual economy framework. The informal and formal sectors are the sub-divisions of the urban sector where migrants not getting employed in the formal sector spontaneously gets a job in the informal sector. In his model, there subsists open urban unemployment despite the existence of the informal sector. There are four distinct different income groups within the working class which result in a positive degree of inequality in the dispersal of income of the laborers, which has been firmly discerned by Harris Todaro (1970). Sen (1974) proposed several politics taking into context the welfare of society. Contemplating the urban sector in small segments and their basic models have been extended in several directions by Stiglitz (1982) and Grinols (1991). Shadow wage rate in the urban formal sector was shown by Stiglitz (1982)

whereas Grinols (1991) was engrossed in modeling the General Equilibrium effects of foreign capital inflow in less developed economies.

Datta Chaudhari (1989), Sarkar and Ghosh (1989) came to a conclusion where the policy which reduces the rate of interest paid by the informal sector also tends to reduce the aggregate output and employment in the industrial sector. Studies shown by Joshi & Joshi (1976) on India has note that average informal sector earnings are roughly equal to if not higher than rural earnings. By taking into account the Heckscher-Ohlin framework and considering the manufacturing sector as a capital-intensive sector and the agricultural sector as the labor intensive, we have viewed the manufacturing sector as an import-competing sector and the agricultural sector and skilled sector as export-competing sectors.

We have upshot the effects of government's regulation, supply chain disruptions and an increase in the precautionary savings on the manufacturing and the agricultural sector. By taking help from Solow (1956) from the technique adapted from Gupta (1993) we have discussed the effects of an increase in saving rate in the long run. We have considered the wage in the agricultural sector as flexible as opposed to the fixed-wage rate in the manufacturing sector. Harris-Todaro framework has been used to explain the migration and the reverse migration between the manufacturing and the agriculture sector. Dasgupta and Rajeev (2020) have made a theoretical analysis of the pandemic in a Keynesian macroeconomic framework in the short run which differs from our paper which reveals the effects of Covid-19 in the informal sector primarily the agricultural sector using a trade-theoretic microeconomic model.

3. Empirical Evidences And Motivation:

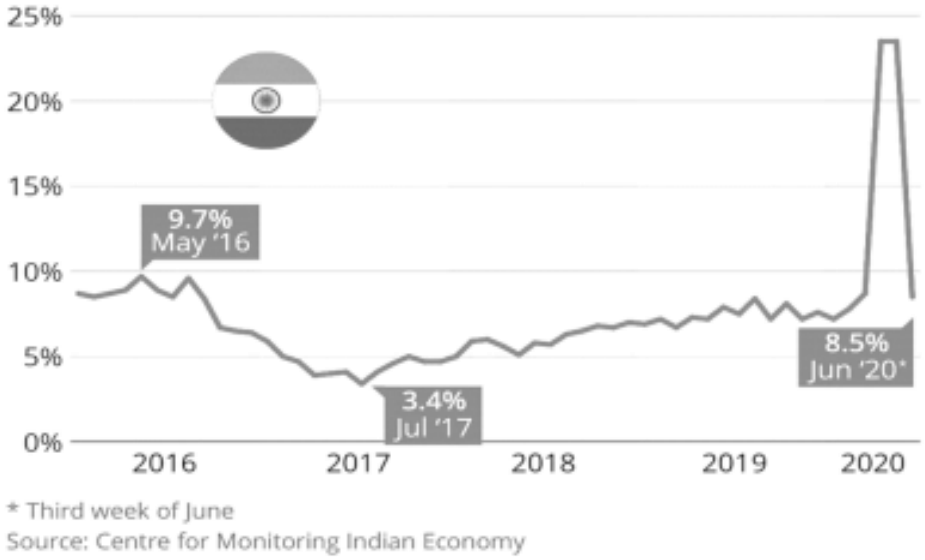
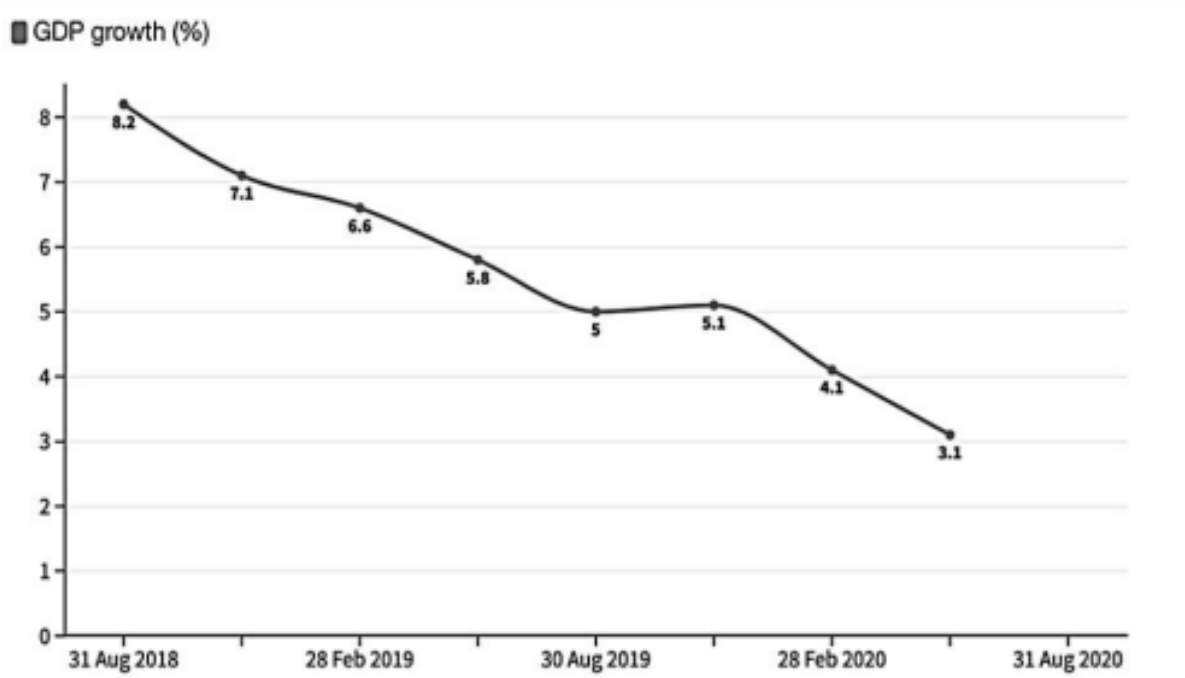


Figure 1: *Figure showing trends in average rate of unemployment in India*

Figure1- shows a steep rise in the average unemployment rate in India during the pre-Covid-19 and during COVID-19 crisis. The data provided by CMIE states that unemployment levels have risen to 27% from 9%. It stood at 29.22% in the urban areas, as against 26.69% in the rural areas. However, the average rate of unemployment had fallen when Government announced the NREGP expansion programme in the rural sector and reverse migration was at peak level.

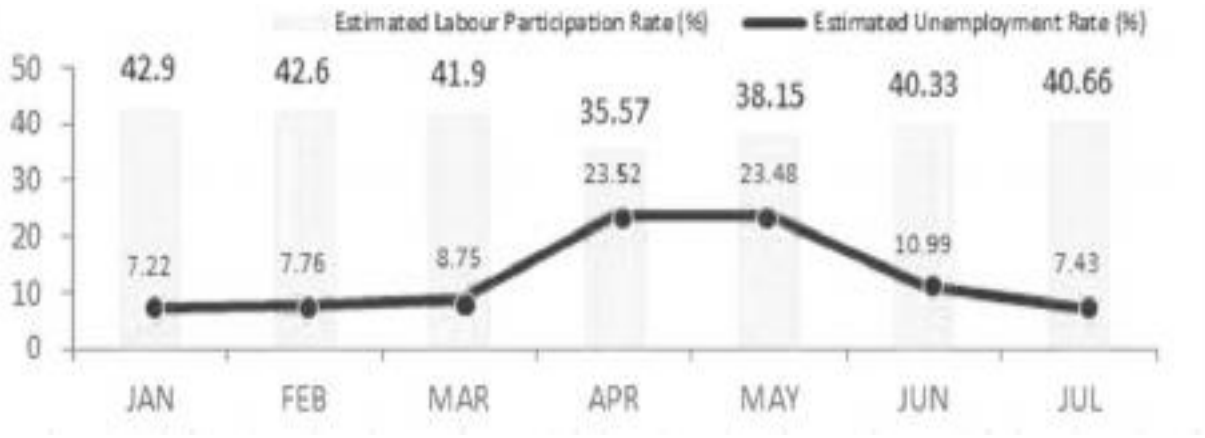


Source: *Ministry of Statistics and Programme Implementation (MOSPI), Government of India*

Figure 2 *GDP growth rate in India*

Figure2- shows the contraction in India's GDP growth rate as a result of Covid-19 virus. World Bank reports 5.2 percent contraction in global GDP in 2020 and a Historic contraction of per capita income. India's real GDP for the April-June 2021 quarter fell by 23.9% in comparison to the same quarter a year ago.

[Table 1 here]



Source: *Centre for Monitoring Indian Economy (CMIE, 2020)*
Figure 3 *Labour force participation and unemployment rate in India during the COVID-19 crisis*

The table above (table 1) had been depicted in figure 1 above which shows the line charts of the rate of unemployment from May, 2017 to April, 2019, i.e., almost for two years from 2017-19. Throughout we see an upward trend in the data, with a slight fall in both Urban and Rural unemployment. Rural unemployment falling from 4% to 3% (approx.) in July, 2017. The urban unemployment falling from 4% to a little over 3% (approx.). We see a notable fall in rural unemployment in the month of May, 2018 from 6% in March, 2018 to a little over 4% (approx.). We also a see a fall in total unemployment in this month of 2018. There is however a notable rise in the urban unemployment in between Jan, and Feb of 2019 and eventually it falls in April, 2019. Another notable fact is that there is a fall in rural unemployment in the months of November, January and March, 2019. However, total unemployment rises from close to 6% to close to 8% (approx.).

[Table 2 here]

The movement observed in the unemployment rate corresponds to the level of reverse migration among unskilled workers in the economy. Table 2 summarizes the rate and level of reverse migration during the COVID-19 crisis.

Given these empirical facts two questions which arise are the following. First, what were the channels through which the COVID-19 crisis penetrated into the Indian economy and particularly in the labour market. Second, what caused Government policy response to COVID-19 to produce counterproductive outcome and lead to policy failure. We attempt to

provide possible explanation to these questions by building an analytically tractable theoretical model in section 4. Few comparative statics and policy analysis have been carried out in section 5. The basic short-run model is extended to long-run dynamics in section 6. Finally, section 7 concludes the paper.

4. The Model:

Given the backdrop, the paper attempts to analyze the effect of COVID-19 on rural-urban migration of unskilled labor, urban unemployment and informalization of labor in terms of supply chain disruption, investment uncertainty, imposition of government regulation and precautionary savings.

4.1. Assumptions and Description of the Economy:

We consider a short run three-sector, three-factor Harris-Todaro type economy with fixed factor coefficient technology. The stylized economy consists of the following sectors. There is a rural agricultural sector (*A*) and an urban manufacturing sector (*M*) both of which uses unskilled labor
(*L*) and capital (*K*) as factors of production. There is a service sector (*S*) which uses capital (*K*) and a specific factor – skilled labor (*S*). The commodity produced by the agricultural sector is given by X_A, the commodity produced by the manufacturing sector is given by X_M and the commodity produced by the skilled sector is given by X_S. Labour market distortions exists in terms of rigid wage and unskilled labor in the urban manufacturing sector. There is involuntarily urban employment due to the rigid wage rate that leads to Harris-Todaro (1970) type rural-urban migration.

The unionized urban manufacturing wage (W_M) is exogenously given and is greater than the flexible rural wage (W_A). This rural-urban wage inequality leads to migration of unskilled labor from the rural sector to the urban sector. Migration equilibrium is attained when the expected urban wage equals the rural wage. In this migration equilibrium, unemployment continues to persist. Therefore, the Harris Todaro equilibrium is suboptimal.

We assume the rural agricultural sector is relatively labor intensive as compared to the urban manufacturing sector which is relatively capital intensive. In other words, this means that the capital-labor ratio (K/L) is lower for the commodity produced in the agricultural sector (X_A) than the commodity produced in the manufacturing sector (X_M), that is,

$\frac{a_{LA}}{a_{KA}} > \frac{a_{LM}}{a_{KM}}$, where a_{Li} is the unskilled labor-output ratio in the *i*-th sector, *i* = *A, M*

a_{Ki} is the capital-output ratio in the *i*-th sector, *i* = *A, M*

There is constant returns to scale in the production of both commodities which means that the amount of output increases in the same proportion as the increase in the amount of inputs. Perfect competition exists in both commodities and factor markets. There is perfect mobility of capital and unskilled labor within agricultural and manufacturing sectors but skilled labor is specific to the skilled sector.

Total capital endowment is assumed to be the sum of domestic capital denoted by K_D and foreign capital which is fixed and is denoted by $\overline{K}_F$.Tastes and preferences are same across the nations. The model assumes there is transportation cost (T) and government regulation (ρ) in the urban manufacturing sector. International trade is always balanced between nations. This is an extension of the Heckscher-Ohlin (H-O) model based on Jones (1965, 1971) framework and Chaudhuri and Mukhopadhyay (2010).

4.2. Equational Structure:

$$W_A a_{LA} + r a_{KA} = 1 \text{ (Numeraire)} \quad (1)$$

$$\overline{W_M} a_{LM} + r a_{KM} = P_M - T \quad (2)$$

$$W_S a_{SS} + r a_{KS} = P_S \quad (3)$$

$$\overline{W_M}\left(\frac{a_{LM} X_M}{a_{LM} X_M + U}\right) = W_A \quad (4)$$

$$a_{LA}X_A + a_{LM}X_M + U = \overline{L} \quad (5)$$

$$a_{KA}X_A + a_{KM}X_M + a_{KS}X_S = \overline{K} \quad (6)$$

$$a_{SS}X_S = \overline{S} \quad (7)$$

$$(X_A - D_A) + P_S(X_S - D_S) = P_M(D_M - X_M) \quad (8)$$

$$a_{LM} = a_{LM}(\rho); \qquad a'_{LM} < 0$$

4.3. Working of the Model:

We have 7 equations and 7 unknowns – W_A, r, W_s, X_a, X_M, X_s, U

Eq. (8) shows the trade balance condition, that is, value of exports = value of imports

It determines the National Income *Y*.

Since ,$\overline{W_M}$ is fixed, *r** is obtained from eq. (2)

Putting the value *r** of in eq. (1), we obtain W_A^*

Putting the value *r**of in eq. (3), we obtain W_S^*

From eq. (6), we obtain X_S^*

From eq. (5) and eq. (7), we obtain $X_A^*$and X_M^* as a function of U

From eq. (4), we obtain U*

It is a decomposable structure because the factor prices are determined by the commodity prices alone and do not depend on the factor endowments.

5. Comparative statics:

In the short run, we obtained the following three propositions:

5.1. Supply-Chain Disruption:

An increase in the transportation cost (T) leads to a fall in the rental rate of capital (r) and a subsequent increase in the unskilled rural wage (W_A) and skilled wage (W_S). This causes the rural wage to exceed the expected urban wage resulting in reverse migration of unskilled labor from the manufacturing sector to the rural sector and ultimately leading to fall in urban unemployment.

Proposition 1: A Supply-Chain Disruption in the manufacturing sector in terms of an increase in the transportation cost (T) leads to reverse migration of unskilled labor from the urban sector to the rural sector which augments informalization of labour and lowers the urban unemployment. Skilled labour gains at cost to capital owners in terms of factor prices.

5.2. Investment Uncertainty:

A fall in the total capital endowment ($\overline{K}$) leads to a fall in the total quantity produced by the manufacturing sector (X_M) and a rise in the total quantity produced by the agricultural sector (X_a) this follows directly from the Rybczynski Theorem. The level of output produced by the service sector (Xs) remains unchanged. Following from the fall in X_M, the probability of getting an urban job decreases. This causes the expected urban wage to fall short of the rural wage resulting in reverse migration of unskilled labor from the manufacturing sector to the rural sector and ultimately leading to fall in urban unemployment.

Proposition 2: An Investment Uncertainty in terms of fall in the total capital endowment ($\overline{K}$) would lead to reverse migration of unskilled labour from the urban sector to the rural sector which augments informalization of labour and lowers the urban unemployment.

5.3. Government Regulation:

As the government imposes strict regulations in factories increase in (ρ), it would lead to a fall in the labor-output ratio (a_{LM}) in the manufacturing sector. The capital used also falls causing an increase in the rental rate of capital (r) and a subsequent fall in the skilled (W_S) and unskilled (WA) wage rates. This causes the expected urban wage to exceed the rural wage resulting in migration of unskilled labor from the rural sector to the urban sector and ultimately leading to a rise in urban unemployment.

Proposition 3: Government Regulation in terms of increase in (ρ) would lead to migration of unskilled labor from the rural sector to the urban sector resulting in rise in the level of urban unemployment and fall in the informalization of labor.

6. An extension: A Dynamic Long Run Equilibrium Model

We develop a dynamic long run equilibrium model which is an extension of Solow (1956) in Jones type general equilibrium. The model assumes that skilled labour and capital owners save a constant fraction 's' of their income and that capital depreciates at a constant rate 'δ' .In our model, we assume that unemployment continues to persist even in the long run. This is proved in Gupta (1998).

Equation of motion for capital accumulation and its time path:

$$\frac{dK_D(t)}{dt} + (\delta - sr)K_D(t) = sW_S\bar{S}$$

$$\Rightarrow \frac{dK_D(t)}{dt} + (\delta - sr)K_D(t) = sW_S\bar{S}$$

For Particular Integral, $\frac{dK_D(t)}{dt} = 0$

For Complementary Function, $\frac{dK_D(t)}{dt} + (\delta - sr)K_D(t) = 0$

$$\Rightarrow K_D^*(t) = \frac{sW_S\bar{S}}{\delta - sr}$$

Let the trial solution be, $K_D(t) = Ae^{bt}$

$$\Rightarrow Abe^{bt} + (\delta - sr)Ae^{bt} = 0$$

$$\Rightarrow Ae^{bt}[b + (\delta - sr)] = 0$$

$$\Rightarrow b = -(\delta - sr)$$

For stability of equilibrium,

$$b < 0 \quad \Rightarrow (\delta - sr) > 0$$

$K_D(t) =$ P.I. + C.F.

$$\Rightarrow K_D(t) = \frac{sW_S\bar{S}}{\delta - sr} + Ae^{-(\delta - sr)t}$$

In the Long Run, $t \to \infty \quad \Rightarrow K_D(t) = \frac{sW_S\bar{S}}{\delta - sr}$

Equational Structure:

$$W_A a_{LA} + r a_{KA} = 1 \quad \text{(Numeraire)} \tag{1}$$

$$\overline{W_M} a_{LM} + r a_{KM} = P_M - T \tag{2}$$

$$W_S a_{SS} + r a_{KS} = P_S \tag{3}$$

$$\overline{W_M}\left(\frac{a_{LM} X_M}{a_{LM} X_M + U}\right) = W_A \tag{4}$$

$$a_{LA} X_A + a_{LM} X_M + U = \bar{L} \tag{5}$$

$$a_{KA}X_A + a_{KM}X_M + a_{KS}X_S = K_D(s, W_s, r, \overline{S}, \delta) + \overline{K_F} \quad (6)$$

$$a_{SS}X_S = \overline{S} \quad (7)$$

$$(X_A - D_A) + P_S(X_S - D_S) = P_M(D_M - X_M) \quad (8)$$

$$a_{LM} = a_{LM}(\rho); \qquad a'_{LM} < 0$$

In the long run, we have the following three propositions:

6.1. Supply-Chain Disruption:

A rise in transportation costs (ceteris paribus), reduces the net revenue from the manufacturing (capital-intensive) sector. Thus we see a fall in rate of return (*r*), hence a rise in agricultural wage and also a rise in the skilled wage.

a) Now, if the rise in skilled wage is dominated by a fall in rate of return, capital stock (domestic) falls. Hence, we see a contraction of the manufacturing sector and an expansion in the agricultural sector. Thus, agricultural wage is more than the expected manufacturing wage, thus reverse migration occurs and we see a fall in unemployment.

Proposition 4: Capital decumulation, given that the fall in rental rate (*r*) dominates the rise in skilled wage rate (*WS*), owing to which the level of unemployment, migration and informalization of labor in the short run is reinforced in the long run.

b) Now suppose in the previous scenario, if the fall in rate of return is dominated by the rise in the skilled wage, capital stock (domestic) rises. Hence, the manufacturing sector expands and the agricultural sector contracts. This initiates migration and thus a rise in unemployment.

Proposition 5: Capital accumulation, given that the rise in skilled wage rate (*WS*) dominates the fall in rental rate (*r*), owing to which the level of unemployment, migration and informalization of labour remains ambiguous in the long run.

6.2. Government Regulation:

A rise in the regulations (ceteris paribus) leads to a fall in the labour per unit of output in the manufacturing sector. Now, we see a fall in skilled wage as well as a rise in agricultural wage but we see a fall in the rate of return.

a) If the rise in rate of return is dominated by the fall in the skilled wage, we see a fall in the domestic stock of capital. Thus, the manufacturing sector contracts and the agricultural sector expands. This leads to a higher agricultural wage, and thus reverse migration, hence fall in unemployment.

Proposition 6: Capital decumulation, given that the fall in skilled wage rate (*WS*) dominates the rise in rental rate (*r*), owing to which the level of unemployment, migration and informalization of labour in the short run is reinforced in the long run.

b) If the rise in the rate of return dominates a fall in the skilled wage, the domestic capital stock increases. This leads to an expansion in the manufacturing sector and the agricultural sector contracts. This leads to rise of the fixed, expected manufacturing wage over the flexible agricultural wage. Thus, migration and a rise in the unemployment.

Proposition 7: Capital accumulation, given that the rise in rental rate (*r*) dominates the fall in skilled wage rate (*WS*), owing to which the level of unemployment, migration and informalization of labour remains ambiguous in the long run.

6.3. Saving Rate:

A rise in saving rate, that is, precautionary saving, (ceteris paribus) causes a rise in the domestic capital stock. Hence, an expansion in the manufacturing sector and a contraction in the agricultural sector occurs. And this results in a fixed manufacturing wage, which is higher than the flexible agricultural wage. Thus, leads to migration and a rise in unemployment.

Proposition 8: An increase in the precautionary saving rate (*s*) would lead to migration of unskilled labor from the rural sector to the urban sector resulting in rise in the level of urban unemployment.

7. Conclusion:

We show in our paper that in the short run, an increase in transportation cost leads to reverse migration from the urban manufacturing sector to the rural agricultural sector resulting in a fall in unemployment in this stylized, small developing country. An increase in the regulatory measures of the government leads to a fall in the rural wage rate and hence their migration from the rural to the urban sector. This aggravates the problem of unemployment in the urban manufacturing sector. An investment uncertainty in terms of a fall in total capital endowment in the manufacturing sector leads to contraction of the manufacturing sector resulting in a reduction of the probability to find a job in the urban sector and a subsequent fall in the expected urban wage. Thus, reverse migration takes place from the urban sector to the rural sector.

However, in the long run, we show that the capital stock is directly proportional with the skilled wage rate, the rate of precautionary savings, and the rental rate of capital and inversely proportional with the depreciation rate of capital. In the long run, an increase in transportation cost or the increase in the regulatory measures of the government, we observe that two situations arise. Firstly, a situation of capital decumulation results in a reverse migration of unskilled labour from the urban sector to the rural sector and a subsequent fall in urban unemployment. Secondly, a situation of capital accumulation results in the migration of labour from the rural sector to the urban sector and the subsequent rise in urban unemployment. Next, we consider an increase in the savings rate (precautionary), which would lead to capital accumulation which in turn encourages rural-urban migration and urban unemployment. In our model, we show that unemployment continues to persist both in the short run as well as in the long run.

However, in the short run, the informal sector acts as a shock-absorbing sector. The fact that the rural unskilled wage is flexible, it follows that whenever there is reverse migration of unskilled labour from the urban sector to the rural sector, the agricultural (informal)

sector readily absorbs this pool of incoming unskilled labour without resulting in any unemployment. This in turn effectively reduces the urban unemployment. Thus, the informal sector plays a crucial role in a small developing economy as it can reduce urban unemployment.

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Mathematical Appendix

$$W_A a_{LA} + r a_{KA} = 1 \quad (1)$$

$$\overline{W_M} a_{LM} + r a_{KM} = P_M - T \quad (2)$$

$$W_S a_{SS} + r a_{KS} = P_S \quad (3)$$

Eq. (2) can be rewritten as:

$$\overline{W_M} a_{LM} + r a_{KM} + T = P_M \quad (2.1)$$

Taking total differential we get,

$$a_{KM} dr + dT = 0 \qquad (\text{Since } d\overline{W_M} = 0 \text{ and } dP_M = 0)$$

$$\Rightarrow \frac{a_{KM} r}{P_M} \frac{dr}{r} + \frac{T}{P_M} \frac{dT}{T} = 0$$

$$\Rightarrow \theta_{KM} \hat{r} + \theta_T \hat{T} = 0$$

$$\Rightarrow \hat{r} = \frac{-\theta_T \hat{T}}{\theta_{KM}}$$

Similarly, totally differentiating eq.(1) and eq.(3) we get,

$$\Rightarrow \theta_{LA} \hat{W}_A + \theta_{KA} \hat{r} = 0 \quad (1.1)$$

$$\Rightarrow \theta_{KS} \hat{W}_S + \theta_{KS} \hat{r} = 0 \quad (3.1)$$

Plugging the value of $\hat{r}$ in eq. (1.1) and eq. (3.1) we get,

$$\hat{W}_A = \frac{\theta_{KA} \theta_T \hat{T}}{\theta_{LA} \theta_{KM}} \qquad \hat{W}_S = \frac{\theta_{KS} \theta_T \hat{T}}{\theta_{SS} \theta_{KM}}$$

$$a_{LA} X_A + a_{LM} X_M + U = L \quad (5)$$

$$a_{SS} X_S = \overline{S} \quad (6)$$

$$a_{KA} X_A + a_{KM} X_M + a_{KS} X_S = \overline{K} \quad (7)$$

Taking total differential of eq. (6) we get,

$$a_{SS}dX_S = 0 \qquad (\text{Since } d\overline{S} = 0)$$

$$\Rightarrow \lambda_{SS}\hat{X}_S = 0$$

$$\Rightarrow \hat{X}_S = 0$$

$$\Rightarrow \frac{a_{SS}X_S}{\overline{S}}\frac{dX_S}{X_S} = 0$$

$$\Rightarrow \hat{X}_S = 0$$

Similarly totally differentiating eq. (5) and eq. (7) we get,

$$\lambda_{LA}\hat{X}_A + \lambda_{LM}\hat{X}_M = -\lambda_U\hat{U} \quad , \text{ where } \quad \lambda_U = \frac{U}{\overline{L}} \qquad (5.1)$$

$$\lambda_{KA}\hat{X}_A + \lambda_{KM}\hat{X}_M = \hat{\overline{K}} \qquad (7.1)$$

Using Cramer's Rule we get,

$$\hat{X}_A = \frac{-(\lambda_{KM}\lambda_U\hat{U} + \lambda_{LM}\hat{\overline{K}})}{\Delta}$$

$$\hat{X}_M = \frac{\lambda_{LA}\hat{\overline{K}} + \lambda_{KA}\lambda_U\hat{U}}{\Delta}$$

Here, $\Delta = \lambda_{LA}\lambda_{KM} - \lambda_{KA}\lambda_{LM} > 0$

By assumption, $\frac{a_{LA}}{a_{KA}} > \frac{a_{LM}}{a_{KM}} \Rightarrow \frac{\lambda_{LA}}{\lambda_{KA}} > \frac{\lambda_{LM}}{\lambda_{KM}}$

$$\Rightarrow \lambda_{LA}\lambda_{KM} > \lambda_{KA}\lambda_{LM}$$

$$\Rightarrow \lambda_{LA}\lambda_{KM} - \lambda_{KA}\lambda_{LM} > 0$$

$$\overline{W_M}\left(\frac{a_{LM}X_M}{a_{LM}X_M + U}\right) = W_A \qquad (4)$$

Eq.(4) can be rewritten as

$$\Rightarrow \overline{W_M} a_{LM} X_M = W_A (a_{LM} X_M + U) \qquad (4.1)$$

Totally differentiating eq. (4.1) we get,

$$\Rightarrow \overline{W_M} a_{LM} dX_M = W_A (a_{LM} dX_M + dU) + (a_{LM} X_M + U) dW_A$$

$$\Rightarrow (\overline{W_M} - W_A) a_{LM} dX_M - (a_{LM} X_M + U) dW_A = W_A dU$$

$$\Rightarrow (\overline{W_M} - W_A) a_{LM} X_M \hat{X}_M - (a_{LM} X_M + U) W_A \hat{W}_A = W_A U \hat{U}$$

$$\Rightarrow (\frac{\overline{W_M} - W_A}{W_A}) a_{LM} X_M \hat{X}_M - (a_{LM} X_M + U) \hat{W}_A = U \hat{U}$$

$$\Rightarrow U \hat{X}_M - (a_{LM} X_M + U) \hat{W}_A = U \hat{U}$$

$$\Rightarrow \hat{X}_M - (\frac{a_{LM} X_M}{U} + 1) \hat{W}_A = \hat{U}$$

Statistical Appendix

Table 1 Unemployment rate in India-Rural and Urban

Month	Unemployment Rate (%)		
	India	Urban	Rural
Nov 2020	6.51	7.07	6.26
Oct 2020	6.98	7.15	6.90
Sep 2020	6.67	8.45	5.86
Aug 2020	8.35	9.83	7.65
Jul 2020	7.40	9.37	6.51
Jun 2020	10.18	11.68	9.49
May 2020	21.73	23.14	21.11
Apr 2020	23.52	24.95	22.89
Mar 2020	8.75	9.41	8.44
Feb 2020	7.76	8.65	7.34
Jan 2020	7.22	9.70	6.06
Dec 2019	7.60	9.02	6.93

Month

Unemployment Rate (%)

Table 2 Volume and rate of regional migration in India

States	Total out migrants, (based on place of the last residence, 0-9 years)	Number of out-migrants by major destination states					Number of return migrants Due to COVID 19 and lockdowns	Number of districts for which return migration
		Maharashtra	Delhi	Gujarat	Punjab	Others		
Bihar	31.88	3.27	5.22	2.52	1.78	19.08	23.6	32
UP	50.46	12.11	9.69	5.37	3.02	20.28	17.48	31
Rajasthan	14.1	2.36	0.98	3.30	0.70	6.75	12.09	22
MP	12.19	3.48	0.57	1.50	0.16	6.49	10.72	24
Odisha	6.26	0.71	0.22	1.18	0.06	4.09	2.19	4
Jharkhand	6.92	0.64	0.38	0.38	0.11	5.41	1.1	3

Perceived Returns to Education and its Impact on Schooling Decisions

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Abstract

In this paper, we empirically calculate the perceived returns to education by surveying students from low and high-income families in Mumbai and Kolkata. These results are interpreted using insights from theoretical models that link education with wages. This allows us to understand how differences between real and perceived returns may affect schooling decisions. Following that, we discuss the reasons behind formation of perceived returns. Risk perceptions towards education are compared using an f-test. To understand the influence of age on perceived returns, a t-test is conducted. Here, we find that perceived returns are universally low for early education. Lower-income students also underestimate returns to tertiary schooling. Variability in future expected wages is higher among high-income students. Among low-income students, the youngest have the highest perceived returns while the opposite is true among students from a high-income background.

Keywords: Returns to education, Perceived returns to education, S-shaped model, Returns to education in India, Schooling decisions

JEL classification: I260, I220

Introduction

For any individual, whether to continue education beyond a certain point is an important investment decision. Under Becker's (1993) human capital theory, an individual would only continue schooling if expected future benefits (i.e., higher wages) exceed costs. Expected future benefits, or the returns to education, are therefore, an important variable which influences schooling decisions. Calculating returns to education is complicated, and while estimates of real returns exist, these results are confined to academic papers that use advanced econometric techniques, thereby making it inaccessible to typical families. Thus, it is the returns *perceived* by students and their parents that end up influencing actual educational decisions, and these are usually formed under uncertainty and limited information. Inaccurate perceptions about returns to education can distort the demand for schooling, affect future labour market outcomes, and keep average educational attainments low (Sequeira et al., 2016).

In India, the need to consider this possibility is especially high as educational levels are low even when measured real returns are high. As we see, the gross enrolment ratio (GER) at primary level is 99.2%, but it drops to 80% by 8th grade, and further to 56.2% and 23% for senior-secondary (10–12th grade) and tertiary education (MHRD, 2018). In comparison, tertiary education enrolment in the US and China are 87% and 39% respectively. Not only that, drop-out rates are above 20% at senior-secondary level even though the mean salary of Indian graduates is 66% higher than high-school pass-outs (NSSO, 2014). Of course, there are several plausible explanations for this such as poverty, credit constraints, accessibility, health, and discrimination. Yet, if underestimating the returns at any level is also a limiting factor for individuals, improving awareness about real returns may be the most cost-effective strategy in improving their educational attainment, and more generally, in raising the demand for schooling.

Review of Literature

As a developing nation, India is one of the youngest countries in the world. With 38.1 million children out of school (UNESCO, 2016) and dropout rates of 15% and 11% for girls and boys respectively, the need to consider various reasons for dropping out of school is essential. Here, we find that physical accessibility is not a deterrent: Close to 95% of all children have a school within half a mile of their residence (PROBE Team & Centre for Development Economics, 1999).

Studies in developed countries like Slovenia (Stanovnik, 1997) and Ireland (Barrett et. al, 2002) have shown that increased demand for skilled labour results in a higher rate of return to schooling and education. Further, several studies show that students of first world countries with good education systems have a better perception of the increase in income with the attainment of different levels of education. A handful of studies for the United States including Smith and Powell (1990); Betts (1996); Dominitz and Manski (1996); Avery and Kane (2004) and Rouse (2004) have proven this.

In India, there is extensive literature on returns to education, but hardly any on the perceived returns and its impact. Chaudhri and Rao (1970) concluded that when the investment into education is taken into account, rates of return reduce with consecutive higher levels of education, thereby forming a concave returns graph. Although, when just

the increase in income is considered for each year of schooling, the graph is more or less linear. For the sake of this paper, the most recent educational return numbers have been extracted from Singhari & Madheswaran (2016).

Evidence from field experiments suggests that perceived returns to education are typically lower than real returns in developing countries. Nguyen (2008) conducted a randomised controlled trial (RCT) in Madagascar where she observed that providing statistics about real returns to education raised the average attendance of students by 3.5%. In Jensen (2010), students at randomly selected schools in the urban Dominican Republic who were given information on higher returns completed on average 0.20–0.35 more years of school than students who were not. In India, the NSSO (71st round, 2014) data on drop-outs shows that the main reason cited for dropping out is "economic and domestic activities". "Financial constraints" is ranked third in importance. Here, prioritising work over schooling may partly be a consequence of underestimating the returns to education.

This literature survey indicates that there exists a difference between perceived and real returns to education. This difference may explain why dropping out of school seems rational to many Indians, though in reality, their decision creates an education-based-poverty trap. Although estimates of the real returns to education exist, the results are confined to academic papers that use advanced econometric techniques, thereby making it inaccessible to typical students and parents. Thus, it is the returns perceived by students and/or their parents that end up influencing actual schooling decisions, and these are likely to be based on imperfect and incomplete information. Thereby, having little reason to believe that the level of education chosen by parents is either individually or socially efficient. Underestimating the returns to education may therefore be lowering the demand for schooling even when measured real returns are high.

Research Questions

1. What are the differences between real and perceived returns to education, and how might they impact schooling decisions?
2. What are the factors influencing the formation of perceived returns to education?
3. How do characteristics such as family income, age, parental education and gender influence one's perceptions of education?

Objectives

- To find empirically the perceived returns to education among lower and higher income households in Mumbai and Kolkata
- To understand the implications of the difference between real and perceived returns on schooling decisions
- To discuss the factors behind the formation of (distorted) perceived returns
- To analyse how perceived returns may vary along with variables such as age, gender, parental education, family income, etc.

Hypothesis

H_0 (1): There is no significant difference between real and perceived returns

H_0 (2): Family income does not affect perceived returns.

H_0 (3): Gender does not affect perceived returns.

H_0 (4): Age does not affect perceived returns.

H_0 (5): Parental education does not affect perceived returns.

Methodology

The following are some conceptual standardizations across the paper:

Levels of educational attainment – In order to divide the various years of education into classes, we've used the brackets followed by the Indian education system and the variable 'n' and 't' are used efficiently display the levels and the time period (in years) to complete the specific levels of education respectively. The values of the same are given as follows-

- Illiterate *(n = 0)* – Haven't attended any educational institute, zero years of education.
- Primary school *(n = 1, t = 5)* – Till 5th grade, with 7 years of schooling (2 years of kindergarten + 5 years from grade 1 to 5).
- Middle/Upper primary school *(n = 2, t = 3)* - Till 8th grade, with 10 years of schooling
- Secondary school *(n = 4, t = 2)* - Till 10th grade, with 12 years of schooling.
- Senior/Higher secondary school - Till 12th grade, with 14 years of schooling.

- College *(n = 5, t = 4)* – Till bachelors' degree graduation. Since the duration of courses varies from 3-5 years (with 3- and 4-year courses more prevalent and common), the study has taken the duration to achieve this level of education as 4 years. Another important point here is that for ease of regarding the year of the degree, the first year is frequently regarded as the 13th grade, second year as 14th and so on.

Defining low- and high-income families: The specific ranges for low- and high-income groups were defined retrospectively from the survey data (see Table 1).

***Table 1**: Defining low and high income categories*

Monthly Family Income			
Location		Min	Max
Mumbai	Low Income	5,000	35,000
	High Income	60,000	6,00,000
Kolkata	Low Income	2,000	30,000
	High Income	50,000	5,00,000

Source: Survey data

Since it is difficult for respondents to think in terms of educational returns, our survey recorded answers in rupees for future expected income. Using this data, we calculate perceived returns for various educational levels and annualize them using the Compound Annual Growth Rate method.

- Returns to education in grade brackets – One unique value for each level, which is interpreted as the percentage increase in income when a person passes an additional educational level.

$$Returns_n = \frac{Income_n - Income_{n-1}}{Income_{n-1}} X\ 100\% \,;\, n = 1,2,3,4,5$$

- Returns annualized (CAGR) – The rate of return to education per year, compounded annually.

$$Returns_n^{annual}\% = \left(\frac{Income_n}{Income_{n-1}}\right)^{1/t} - 1 \; ; n = 1,2,3,4,5$$

$$Where\ t = time\ period\ (in\ years)\ of\ education\ for\ level\ 'n'$$

Returns at level n ($Returns_n^{annual}\%$)would be interpreted as each year of additional schooling after level 'n-1' and before level 'n' would increase a person's income by provided the individual completes level 'n' of education.

Primary Data Sampling

Target population: Students from low- and high-income families, currently studying in 8th to 16th grade.

Target Area: Urban and sub-urban parts of Mumbai and Kolkata.

Survey instrument: Questionnaire
Survey Methods: Telephonic interview with participants from low-income families. Online survey via Google forms for participants from higher-income families.

Collection of samples: Randomisation method was used to recruit participants from low-income families. Convenience and snowballing methods were used to get participants from higher-income backgrounds.

Conducting the survey: The telephonic interviews, as well as the online questionnaire survey, was conducted between 1st to 10th October 2020. One of the researchers volunteered at an NGO named 'Youth Empowerment Foundation' that helps the underprivileged communities around the country. The contact details of participants from low-income backgrounds were extracted from the NGO's database after securing the required permissions. The participants from well-off backgrounds were sampled with the researchers' contacts.

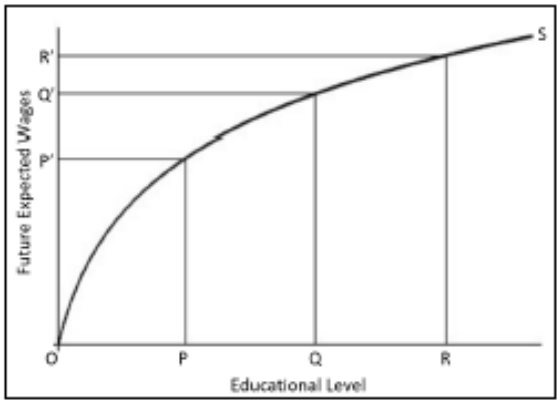
The questionnaire is attached as Appendix 1. The participants were told not to take inflation into account when thinking of future expected wages. Hence, all income figures are in the current rupee value.

Analysis

Linking Education with Wages

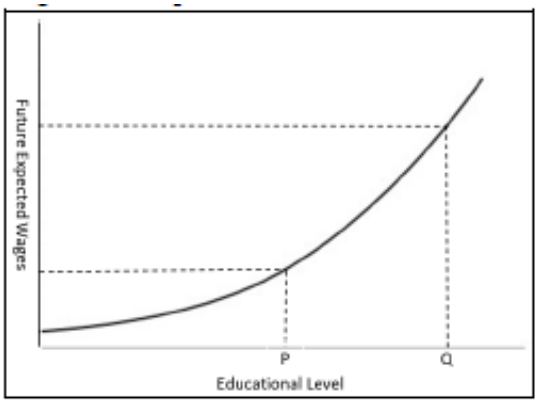
There are three main models for linking educational level with future expected wages: (a) Diminishing returns; (b) S-shaped curve; and (c) Exponential curve.

Figure 1.1: Diminishing returns to Education



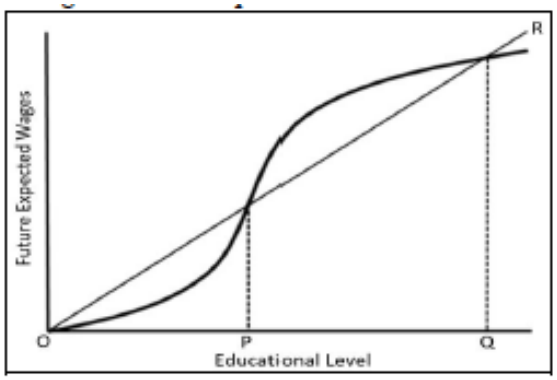
Source: Author's construction

Figure 1.2: Exponential Returns to Education



Source: Author's construction

Figure 1.3: S-shaped returns to Education



Source: Author's construction

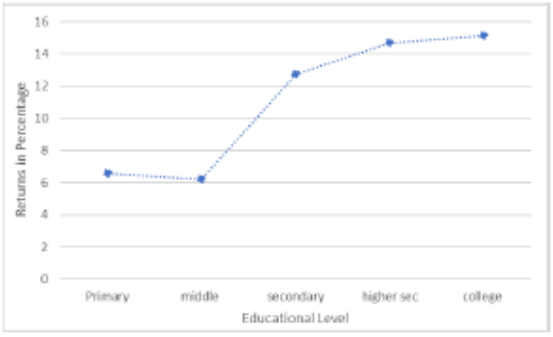
These models represent different conceptions of returns to education. In Fig 1.1 is true, then education exhibits diminishing returns i.e., returns are highest at earliest levels and reduce with an increase in qualification. There are good reasons behind this: the cost of primary schooling is low compared to higher levels; it is often a requirement for access to higher education; and the productivity differential between illiterate persons and primary graduates is significant (Psacharopoulos, 1994). Evidence from field experiments supports this view (Psacharopoulo and Patrinos, 2004).

However, if Fig 1.2 is true, then returns to early education are the lowest and wages rise rapidly with an increase in educational attainment. This model is premised on research that shows that tertiary/higher-education wage premiums have been increasing over time and are highest in comparison to other educational levels (Azam, 2009; Montenegro and Patrinos, 2014).

Finally, as in Fig 1.3, education may also yield S-shaped returns. Under this model, returns for early education are low; they rise sharply at higher levels before reducing again. Notably, it differs from the exponential model since the highest increase in wages is experienced after secondary or senior-secondary schooling, and not after tertiary education. This model is likely true in regions where there is a shortage of high-skilled jobs (Banerjee and Duflo, 2011). Here, a lack of demand for high-skilled labour reduces the value of tertiary education. This role of demand in determining the returns to education has been documented extensively in the literature (Foster and Rosenzweig, 1996; World Bank, 2000).

Comparing Real and Perceived Returns

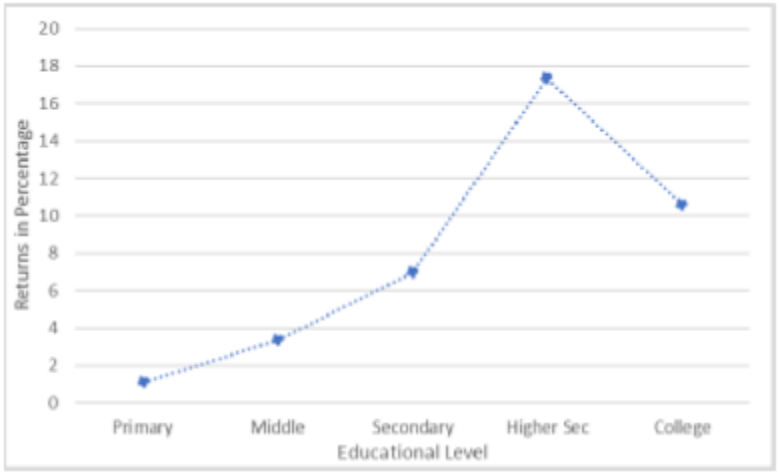
Figure 2: Real Returns to Education in India (Urban)



Source: Author's construction based on data from Agarwal (2011)

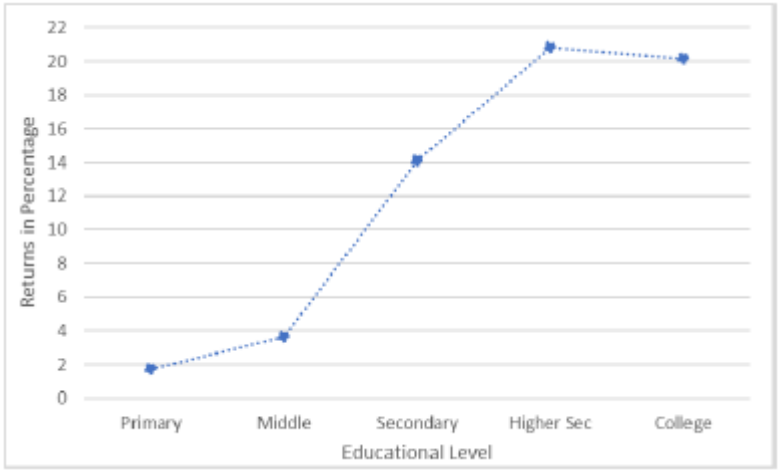
In Figure 2, we find that the real returns to education in India (urban) are increasing with every level of education (except middle-school, but only marginally). This is indicative of the exponential model (Fig 1.2) since wages are rising at an increasing rate with respect to educational qualification. Between middle and secondary level returns, there is a difference of 6.5% which suggests a sharp rise in returns after middle school. Here, as in our empirical results, the rate of return is annualised. The interpretation is: Each year of additional schooling after middle-school and before secondary completion would increase wages by 12.7% for an individual who completes secondary education.

Figure 3.1: Perceived Returns of Low-Income Students



Source: Survey results

Figure 3.2: Perceived Returns of High-Income Students



Source: Survey results

Fig 3.1 and 3.2 represent the perceived returns for students of low-income and high-income households respectively. Our results in Fig 3.1 show that for students of low-income households, returns for higher-secondary level are perceived to be highest (17.4%). Following that, there is a sharp decline in perceived returns for college education (10.6%). This is suggestive of the S-shaped model since returns are initially low, then rise rapidly at higher levels before falling again. For high-income students in Fig 3.2, perceived returns for higher-secondary and college levels are highest and roughly the same (20.9% and 20.1% respectively). Thus, their expectations resemble the exponential model since returns are greatest at highest levels of education.

Implications of Differences between Real and Perceived Returns

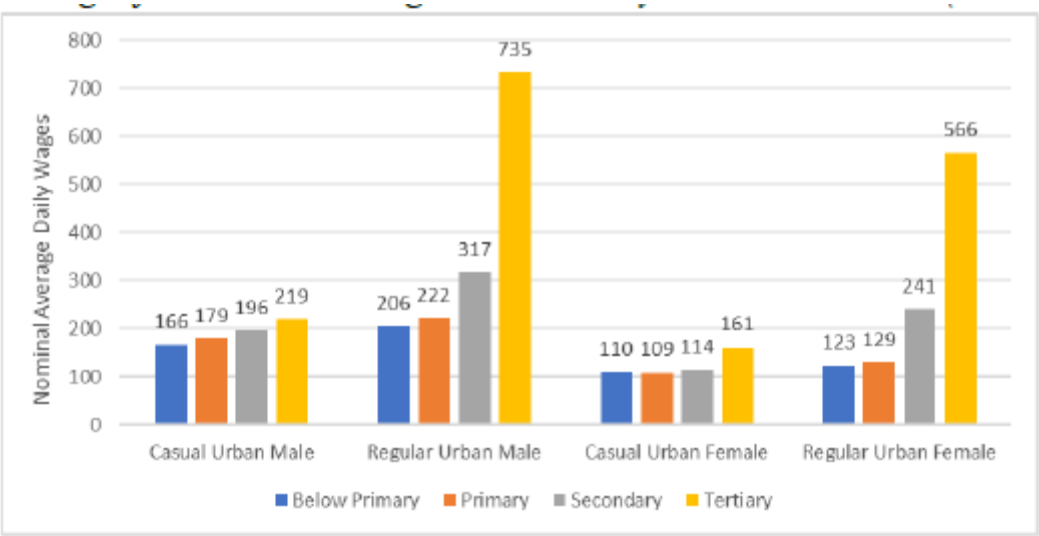
Upon comparing our empirical results with real returns, some differences stand out. First, as seen in Table 9 of Appendix 2, both samples have significantly underestimated returns to early education. At primary level, estimated real returns are 5.6 percent whereas our low-income and high-income samples have reported 1.1 and 1.7 percent respectively. In fact, these figures are likely an overestimation owing to the effect of outliers on our small sample size (n=211). 75 percent of low-income and 74 percent of high-income respondents reported the same future expected wages for illiterate and primary levels i.e., their perceived returns to primary education were zero (negative if foregone work experience is considered). This is in stark contrast to the diminishing returns model.

One factor behind this could be the low quality of primary education in India. Duraisamy (2002) argues that qualitative factors such as high pupil-teacher ratios, poorly qualified teachers, low financing of public schools, high teacher-absentee rates, etc. may be driving down returns to primary education. In fact, Singhari and Madheswaran (2016) show that returns to primary schooling have been declining in India since the 1990s. A report by Pratham (2012) found that only 46.5% students in Class V could read Class I textbooks in Indian government schools. This infrastructural lack of focus on the quality of early education may be why perceived returns were found to be so low viz-a-viz higher education. Here, knowledge about the increasing automation of low-skilled jobs may also be a factor.

Second, the samples peak at different qualifications. This is most evident at college level where the difference between perceived returns for the two samples is 9.5 percent. High-income students thus value tertiary education much more highly than low-income students. In part, this reflects the changing attitudes between job security and specialisation. Many of our low-income respondents suggested that they wanted to apply for government jobs after 12th graduation. In India, completing higher secondary (10+2) makes one eligible for most government jobs (railways, defence, admin staff, etc.). Given the payment standards and wage security, government jobs are extremely lucrative when compared to private-sector jobs, especially for lower-income classes. This is supported by a recent study conducted across 10 Indian cities which showed that demand for government jobs among 18- to 30-year-olds had increased during the Covid-19 pandemic, with 82.3 percent of respondents preparing to apply for government jobs (Mint, 2020). This drives up the perceived returns for higher-secondary as a host of jobs become available upon graduation.

Aside from job security, the nature of employment matters too. Low-income groups are overrepresented in the casual workforce while high-income individuals are more likely to be regular workers (ILO, 2018). As we see in Figure 4, differences in educational qualification matter more for regular workers. For both genders, the wage premium for casual workers is flat i.e., educational returns are very low. Among regular workers, however, the wage premium for tertiary education is large. The ratio of the wage-rate of the highest-educated to illiterates is only 1.3 for casual workers compared to 3.5 for regular workers.

Figure 4: *Wages for Casual and Regular workers by Educational Level (2011-12 INR)*



Source: Author's construction based on NSSO estimates

Given this data, we see that there is no incentive for a student to opt for higher education if s/he expects to join the casual labour force. On the other hand, individuals who expect to join the regular workforce have a strong incentive to acquire higher education. This may be why perceived returns for tertiary education fall for the low-income sample while remaining high for the high-income group. Interestingly, when asked to estimate wages for current thirty-year-olds, the perceived returns for college-level were calculated to be 12.7 and 15.8 percent for low-income and high-income samples respectively (see Table 10 of Appendix 2), compared to 10.6 and 20.1 percent for themselves. The low-income students thus believed that others would benefit more from tertiary education than themselves, while high-income students believed the opposite.

Finally, belief in the S-shaped or exponential model of returns to education implies that it makes sense for families to choose 'winners' and 'losers' among their children. In our sample, both income-groups undervalue early education while generally overvaluing higher levels of schooling. Under these beliefs, poor families who can only afford to educate their children till primary or middle-school levels will receive low returns while richer families who educate their children beyond secondary levels will face significantly higher returns. As a result, poor families are motivated to 'choose' a child who is most likely to reach higher levels of education and invest all their resources on him/her. Over time, this can lead to an increase in drop-out rates and greater inequality both within and among families (Schultz,

2004). Akresh et. al (2010) found that in Burkina Faso, teenagers were more likely to be enrolled in school if they scored high on a test, but *less* likely to be enrolled if their sibling had scored high. This kind of 'winner-picking' in education indicates that perceived returns play an important role in determining real schooling decisions.

Family Income and Perceived Returns

Table 2: t-Test results for low-income versus high-income perceived returns (for oneself)

	Lower Income, own	*Higher Income, own*
Mean	20.80857105	33.96469226
Variance	524.5951972	1408.807486
Observations	495	555
Hypothesized Mean Difference	0	
Df	931	
t Stat	-6.93563796	
P(T<=t) one-tail	3.78017E-12	
t Critical one-tail	1.646491968	
P(T<=t) two-tail	7.56034E-12	
t Critical two-tail	1.962515333	

Since t-stat lies outside the region of acceptance, we reject H0(2): Family income does not affect perceived returns. At α=0.05, perceived returns of the high-income sample are significantly greater than the lower-income sample. Upon disaggregating the data, we find that for primary and middle levels, we are unable to reject H0(2), but for secondary, higher secondary, and college levels, perceived returns for both samples are significantly different.

Thus, family income seems to impact perceptions toward higher levels education more distinctly, while perceived returns for early education appear to be universally low.

Interestingly, looking at the t-Test results in Appendix 2, Tables 11 and 12, we find that the lower-income sample believes that they will lower educational returns than the population average, while the higher-income sample believes that they will face better educational returns than the population average[2]. These results are consistent across every

educational level. This may be due to self-perceptions about one's ability to 'convert' education into higher wages, and is discussed in detail soon.

Parental Educational Level and Perceived Returns

Table 3: t-Test results summarised for parental educational levels

Parental Educational Level (Both x-and y-axis)	Illiterate	Primary	Middle	Secondary	Higher Secondary	College and Above
Illiterate (I)	*	*	*	*	*	*
Primary (P)	P>I	*	*	*	*	*
Middle (M)	I>M	P>M	*	*	*	*
Secondary (S)	S>I	S>P	S>M	*	*	*
Higher Secondary (HS)	HS>I	HS>P	HS>M	Fail to Reject	*	*
College and Above (C)	C>I	C>P	C>M	C>S	C>HS	*

Source: Author's analysis of survey data

In Table 3, we find that in general, children of parents with higher levels of education reported higher perceived returns. The only outlier is middle-school (M) which shows the opposite trend. Similarly, as seen in Figure 9 of Appendix 2, we find that for students of parents with lower levels of education (illiterate, primary and middle), expected wages for 'population average' is higher than 'oneself', while this trend is reversed for students of parents with higher levels of educational attainment (secondary, higher secondary, college and above). Simply put, students of parents with high educational attainment believe that will fare better than the population average, and vice versa. Some potential reasons for this are discussed below.

How May Family Income and Parental Education Be Affecting Perceived Returns?

In this section, we consider the influence of family income and parental education together since they are highly correlated both in our sample and in the population (ILO Wage Report, 2014). One reason why perceived returns are positively correlated with high-family income/greater-parental-education may be the complementarity between 'ability' and education (Harmon et al., 2003). Here, ability refers to the efficiency with which one can[2] 'convert' education into higher wages. Ability depends on non-quantifiable factors such as soft-skills, and here, students of high family income/greater parental education have a distinct advantage. For instance, consider the English language fluency. Chakraborty and Bakshi (2016) found that in India, a 10% lower probability of learning English in primary schools leads to a decline in weekly wages by 8%. Students from higher-family-income/greater parental-education are more likely to be fluent in English (among other soft-skills), and may thus be more confident about getting higher paid jobs that require competency in soft-skills. In fact, a major reason why students of low-income/lower-parental-education families think that they will fare worse than the population average (and vice-versa) may be their self perceptions about their 'ability' i.e., their soft-skills (Appendix 2: Figure 7, Tables 11 and 12). In other words, their belief that they don't possess the adequate tools to 'convert' education into higher wages may be lowering their perceived returns to education.

Other reasons may be that students from high-family-income/greater-parental-education grow up in a better learning environment and have access to higher quality education. The difference between the quality of private and public education in India is well documented (Pratham, 2012), and its impact on perceived returns have been discussed above. Brand and Xie (2010) have noted the effect of neighbourhood and peer influences on risk perceptions on education. The extent to which one's neighbourhood (including one's immediate friend circle) values education may, in fact, affect perceived returns. A student

[2] Although we fail to reject H0 for the higher-income sample (Appendix 2, Table 9), the mean of perceived returns for 'own' is greater at every educational level compared to 'population average'. Also, when a t-Test is conducted on expected wages rather than perceived returns of the high-income sample, we find that wages for 'own' are significantly greater than 'population average' at $\alpha=0.05$. These suggest that the high-income sample believes that they will face higher educational returns than the population average.

from a privileged background is also likely to have better contacts and information about employment, and therefore has a better chance of securing a high-paying job in the formal sector (Krishnan, 1996; Siphambe, 2000). Knowledge of these qualitative differences may be affecting our sample's perceived returns, especially for tertiary education. Finally, under financial market imperfections, differences in family backgrounds entail different marginal costs in attaining education. This affects children of poorer families adversely as they face higher costs, especially at the college level (Checchi, 2006). This may be either due to debt financing or due to nepotism in labour markets which reduce educational returns for the less privileged. Agnarsson and Carlin (2002) find that 13% of the marginal return to additional schooling in Sweden is due to family background. Lam and Schoeni (1993) show that returns to schooling drop by about one-third when parental schooling is controlled for in Brazil. Thus, beliefs about higher costs to education and nepotism in the labour market (both of which may be justified) may be driving down the perceived returns to education for students from less privileged families.

Analysis of Variance

Most papers in the literature have neglected the role of risk perceptions in schooling decisions. For poor families, risk perception may deter investment in education even when expected returns are high. Thus, a poor student may decide to not go to college if s/he is extremely unsure of their future earnings. Since we find that perceived returns for the lower income sample falls sharply for tertiary education, it is imperative to ask whether risk perceptions toward education are significantly different among both sampled groups. Here, we use a right-tailed F-test to compare the variances of both samples.

Variable 1: Higher-income sample's perceived returns for college

Variable 2: Lower-income sample's perceived returns for college

$\alpha = 0.05$

H0: $\sigma^2 1 = \sigma^2 2$

Ha: $\sigma^2 1 > \sigma^2 2$

Table 4: f-test between the lower and higher income sample's perceived returns

	Variable 1	*Variable 2*
Mean	73.36916351	35.54191
Variance	1823.274859	510.5985
Observations	1111	99
df	110	98
F	3.570858058	
P(T<=t) one-tail	2.98481E-10	
F Critical one-tail	1.385930401	

Source: Author's analysis of survey data

$F > F_{critical}$, so we reject H0.

Thus, our evidence suggests that that the variance for high-income sample's perceived returns for college is higher. This is in contradiction to studies (Nguyen, 2008; Attanassio and Kaufmann, 2008) which show that risk perceptions (as understood through variance in future expected earnings) toward education are much higher among low-income groups. According to our data, variability in future earnings does *not* explain low perceived returns for college among lower-income students. Here, financial constraints, lack of high-skilled jobs, quality of education, etc. may play a greater role in determining perceived returns.

Gender and Perceived Returns

Table 5: t-test for the expected future income - males v/s females

	Whole sample, Male	Whole sample, Female
Mean	39171.09145	28620.9622
t Stat	7.619024693	
T Critical two-tail	1.96187278	

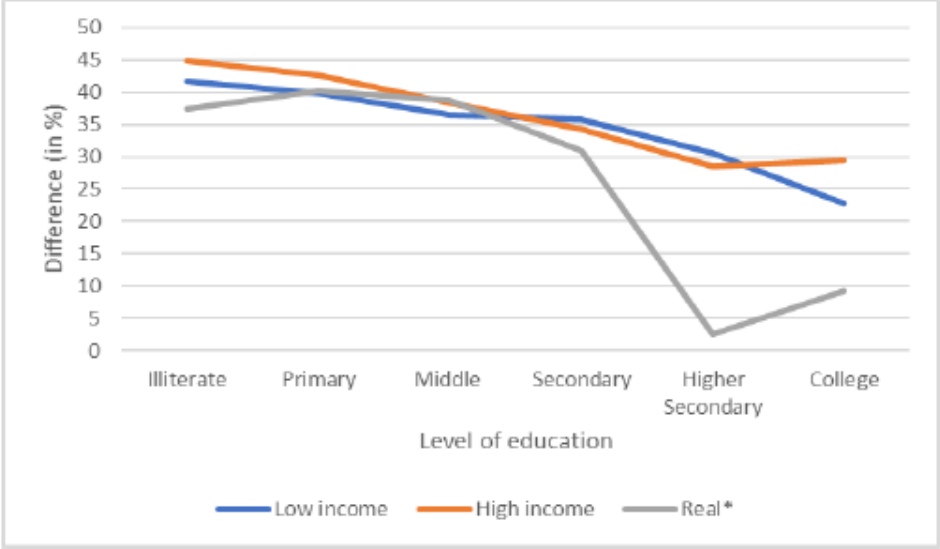
Source: Author's analysis of survey data

The t-test in Table 5 shows that there is a significant difference between the genders' perception of future wages. Tables 14 and 15 in Appendix 2 show that this

difference holds at both income levels. Across both income groups, males also reported a consistently higher future expected wage than females at all levels of education (See Appendix 2, Figure 8&9). Putting this into perspective, Figure 5 plots this gap in their expectation as a ratio of expectation of males. It is calculated as follows:

$$Gap\ in\ expectation = \frac{(Males'perception - Females'perception)}{Males'perception} x100\%$$

***Figure 5**: Difference in perception of one's future wages (males v/s females, as a % of males' perception) along with the real wage gap*



Source: Author's Construction based on survey results; Source: IGIDR*

The gap in expectation of future wages follows a decreasing linear trend. Here, a variety of social factors such as a belief in patriarchy (rather, belief that employers in the labour market are patriarchal) to women having an ingrained sense of lower self-worth may explain why women expect lower wages than men across the educational spectrum. Since we asked respondents to report expected wages at 30, women likely took motherhood into consideration. Other factors constant, `motherhood penalty' accounts for up to 50% of the wage gap between genders (Waldfogel, 1998). Belief in the `motherhood penalty' may be why women have lower expectations about future wages. Interestingly, the variables follow a similar pattern till secondary level. Following that, real wage-gap falls steeply for higher secondary and college while perceived differences remain roughly the same (Figure 5). Thus, in our sample, the difference in perception of future wages between males and

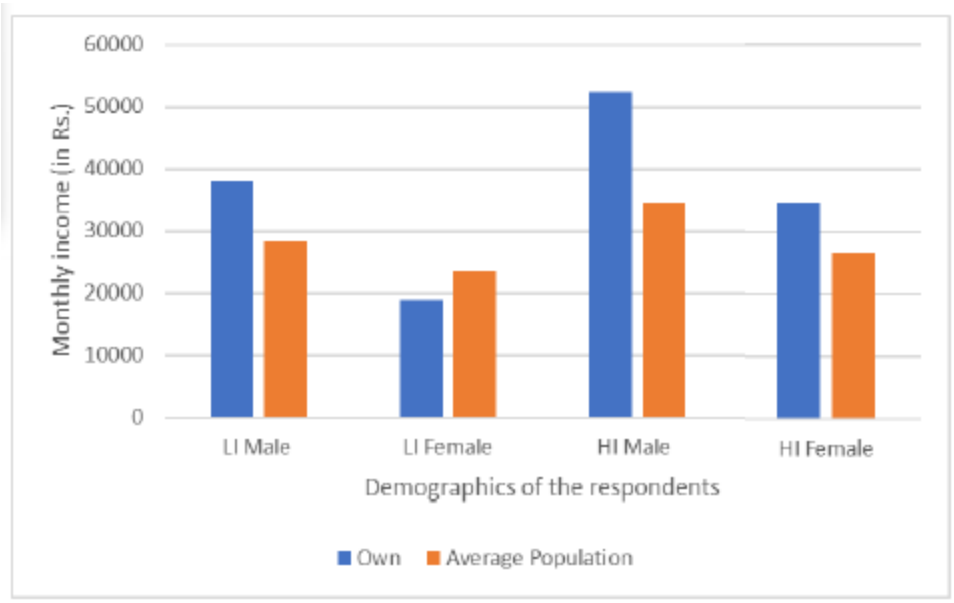
females is greater than in reality for higher educational levels. This may be one of the factors behind low tertiary educational attainment among females.

Table 6: T-test results between expected income of oneself v/s the population at all levels of education

	Male	Female
Lower Income	Oneself > Pop Avg	Oneself < Pop Avg
Higher Income	Oneself > Pop Avg	Oneself > Pop Avg

Source: Author's analysis of survey data

Figure 6: Predicted monthly wages – oneself v/s others



Source: Author's Construction based on survey results

Table 6 shows that the LI female sample's perceived future wages were significantly lower than the population average at every level of education. However, all other groups' perceived wages are higher than the population average. This indicates that the positive effect of belonging to higher income families on perceived wages is more significant than the negative effect of gender. This may be because jobs relating to domestic help, largely occupied by women, are paid lesser than traditional jobs occupied by men with the same academic attainment (Nandal, 2005). For LI females with high levels of educational

qualification, the supply of secure and well-paid jobs remains low, which either makes them opt out of the labour force or settle as an underemployed and underpaid worker (Das & Mehta, 2012). Formal sector jobs are very competitive and require connections, and here, low-income families (especially women) are likely to be at a disadvantage.

Age and Perceived Returns

Table 7: Optimism level of the sample by t-tests

Demographics	Optimism level about the job market High -> Low
Lower income background	$8\text{-}10^{th}$ > $11\text{-}13^{th}$ = $14\text{-}16^{th}$
Higher income background	$14\text{-}16^{th}$ > $8\text{-}10^{th}$ > $11\text{-}13^{th}$
Combined	$14\text{-}16^{th}$ = $8\text{-}10^{th}$ > $11\text{-}13^{th}$

Source: Author's analysis of survey data

Table 8: Gross Enrollment Rates (GER) in India for 2015-16

Level	Primary	Middle	Secondary	Senior secondary	College
GER	99.20%	92.80%	83.90%	55.80%	20.80%

Source: MHRD, 2018

Table 7 indicates that the students currently pursuing senior secondary education and their first year in degree college have less incentive to complete their education compared to the ones in their final 3 years of degree college and secondary school. There is a sense of uncertainty about the future in senior secondary school since the shift in educational institutes depends on entrances and board exam scores, which might make an individual pessimistic about the future. Additionally, infamously tough entrances and the coaching `shadow education' industry built around it puts students under considerable pressure (Bray, 2003). A study by Smith & Wertlieb (2005) shows that the academic and social expectation of first year college students do not align with their expectations, thereby making it a little tough for them to adjust and cope.

The Gross Enrolment Rates (Table 8) support the findings from Table 7. As students transition from senior secondary to college, there is a steep fall of 35% in

enrolment rates. There are various reasons that students prefer to not continue their education. 'Education Quality Upgradation and Inclusion Programme' report by the HRD ministry states "empirical evidence points towards the persistence of economic, social, locational, and regional disparities in access to higher education. The higher education system and institutions have to recognise and adapt to meet the demand from diverse communities of students". The sample data collected also shows the additional factor of optimism of income that may make them lose interest in pursuing their further education.

Policy Review

Having analysed how perceived and real returns vary along characteristic variables, it may now be instructive to discuss various methods of intervention that can make perceptions about education more attuned to reality. Here are three possible methods:

1. **Role Models** (Nguyen, 2008) – Role models serve as a direct 'witness' of educational success to students and parents. By appealing to their common background, this method can raise perceived returns through a direct emotional connection with the target group.

2. **Financial recognition** (Sequeira et.al, 2014) – Rewarding educational achievement with fellowships/scholarships makes schooling profitable in the short run. It reduces uncertainty about the future, thereby incentivising educational investment.
3. **Flyers and awareness campaigns** – Providing information about real schooling outcomes is a cost-effective way to change perceptions. Likely effective in situations with great information uncertainty.

Role models can be effective among lower-income families. Since the models share similar backgrounds with the students, it is easier to relate to them and build a level of trust. Financial recognition will likely be more effective in raising perceptions of students pursuing higher education since it is difficult to discern talent during early education. This would effective especially be for low-income students since apart from the reassurance of education being a good investment, it would also support poorer families that require immediate financial gains. Flyers and campaigns are the most cost-effective and can be used with any target group.

Conclusion

In this paper, we empirically calculate the perceived returns to education in India and discuss how perceptions vary along characteristic variables. Perceived returns to primary education are found to be low universally. Low-income families underestimate returns at college level. There is low optimism about future expected wages in the 11^{th}-13^{th} grade age bracket, and there is a significant difference in educational perceptions between males and females. Low income females perceive their income to be lower than population average. Volatility in perceived returns to college education is higher for students hailing from well-to-do families, which is contradictory to most findings in other developing nations. Based on our results, we also recommend various interventions to attune perceptions about education with reality.

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Appendix 1

The Questionnaire

Section 1: Demographic questions

1 (a). Age

1 (b). Sex

1 (c). What standard are you studying in? (Note for college students: if you're in the First year, enter '13'. Second year students enter '14' and so on)

1 (d). Family income (monthly) _____

1 (e). What is the educational level of your parents?

Section 2: Expected income when you are 30

The next 5 questions all relate to the same hypothetical scenario mentioned below.

Question: Suppose you were to complete **x-level of education**, stop attending school, and immediately start working afterword. Think about what kinds of jobs you might get. How much do you think you will earn when you are 30 years old? Enter answer as **monthly** salary.

In the questions below, different values for the '**x level of education**' are mentioned. Answer in today's money value. ***Do not*** take inflation into account.

2 (a). x = No educational qualification i.e., never attended school (illiterate) 2 (b). x = primary school education (5th grade)

2 (c). x=middle school education (8th grade)

2 (d). x=secondary school education (10th grade)

2 (e). x=senior secondary school education (12th grade)

2 (f). x= college education (bachelor's degree)

Section 3: Guessing income of current 30-year-olds

In this section, we are asking you to guess the average **monthly** salary of people who are currently 30 years old who have completed **x level of education**. This is different from the previous section in that we are asking you to guess the average salary of others (not just about the people you know personally, but people across the country), not yourself. Once again, think about the kind of jobs they will be qualified for in each scenario, and then write down the average monthly salary that a current 30-year-old with that level of education receives.

There are no wrong answers. Just write down what you think an average 30-year-old receives.

Please enter only numeric values. The answer should be the **monthly** salary.

3 (a). x = No educational qualification i.e. never attended school (illiterate) 3 (b). x = primary school education (5th grade)

3 (c). x=middle school education (8th grade) 3 (d). x=secondary school education (10th grade) 3 (e).

x=senior secondary school education (12th grade) 3 (f).

x= college education (bachelor's degree)

Appendix 2

Table 9: Comparing Real and Perceived Returns

Educational Level	Real Returns	Low-Income Sample	High-Income Sample
Primary	5.6	1.1	1.7
Middle	6.2	3.3	3.6
Secondary	11.4	7.0	14.0
Higher Secondary	12.2	17.4	20.9
College	15.9	10.6	20.1

Table 10: Perceived Returns for Current 30-year-olds

Educational Level	Low-Income Sample	High-Income Sample
Primary	3.0	2.0
Middle	3.1	5.2
Secondary	4.8	10.1
Higher Sec	11.3	13.7
College	12.7	15.8

Table 11: t-Test results for low-income versus high-income perceived returns (for oneself)

	LI own	*HI own*
Mean	20.80857105	33.96469226
Variance	524.5951972	1408.807486
Observations	495	555

Hypothesized Mean	0	
df	931	
t Stat	-6.93563796	
P(T<=t) one-tail	3.78017E-12	
t Critical one-tail	1.646491968	
P(T<=t) two-tail	7.56034E-12	
t Critical two-tail	1.962515333	

Table 12: t-Test results for perceived returns of low-income (oneself) versus low-income (population average)

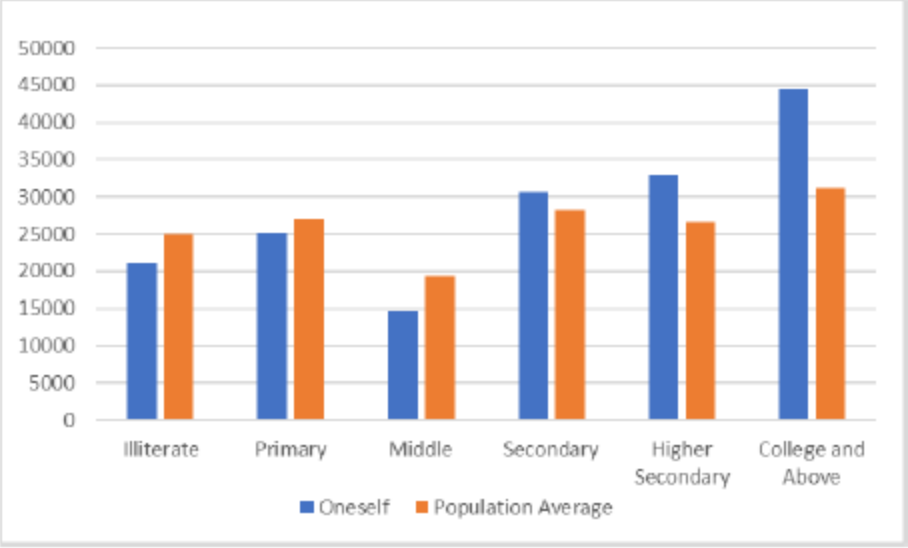
	LI own	*LI popln.*
Mean	20.80857105	22.96670436
Variance	524.5951972	624.9863933
Observations	495	495
Pearson Correlation	0.57304348	
Hypothesized Mean	0	
Df	494	
t Stat	-2.161765286	
P(T<=t) one-tail	0.015557908	
t Critical one-tail	1.647944008	
P(T<=t) two-tail	0.031115815	
t Critical two-tail	1.96477774	

Table 13: t-Test results for perceived returns of high-income (oneself) versus high-income (population average)

	HI popln	*HI own*
Mean	31.65503121	33.96469226

Variance	1067.913776	1408.807486
Observations	555	555
Pearson Correlation	0.645155459	
Hypothesized Mean Difference	0	
Df	554	
t Stat	-1.819749854	
P(T<=t) one-tail	0.034668323	
t Critical one-tail	1.647608746	
P(T<=t) two-tail	0.069336646	
t Critical two-tail	1.964255274	

Figure 7: Average Future Expected Wages by Parent's Education Level



Source: Author's Construction based on survey results

Table 14: t-test for the expected future income – HI males v/s HI females

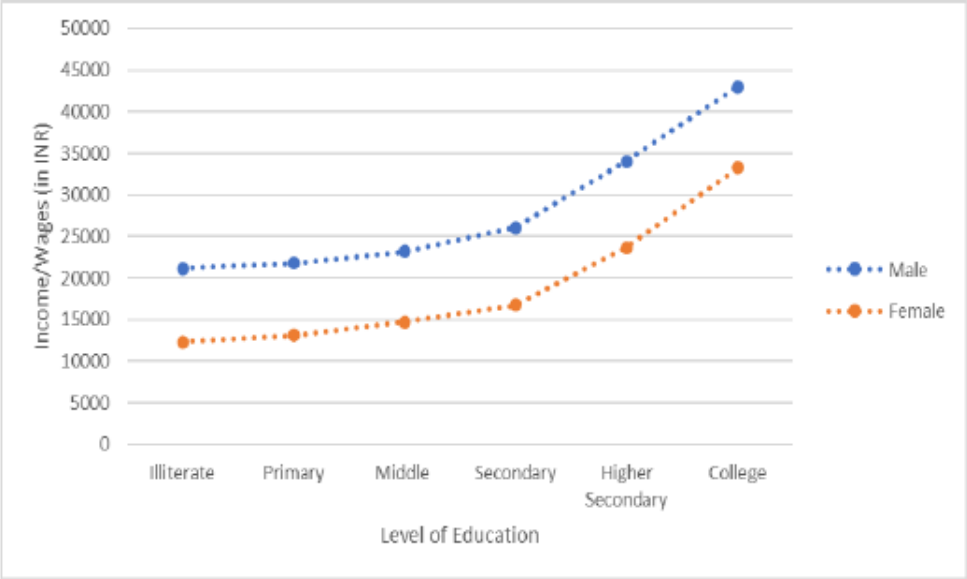
	HI Male	HI Female
Mean	52495.09804	34682.91782

t Stat	7.724186413	
t Critical two-tail	1.964424727	

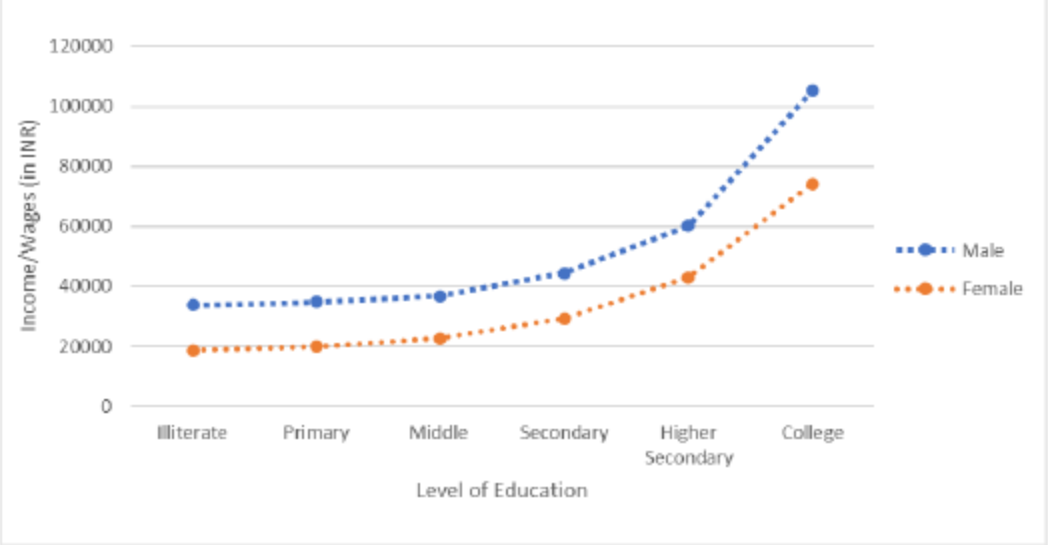
Table 15: t-test for the expected future income – LI males v/s LI females

	LI Male	LI Female
Mean	28211.02151	18968.46847
t Stat	8.698949335	
t Critical two-tail	1.964475628	

Figure 8: Lower-income sample's perceived incomes



Source: Author's Construction based on survey results



Source: Author's Construction based on survey results

The Concoction Competition: A Covid-19 Case Study

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Abstract

Major countries stood at the brink of recession in 2020. The primary assumption of this paper is that, in a world affected by a pandemic, adjustments in the competition policy by the government, to regulate market efficiency, led to a shift in the form of market competition in the pharmaceutical sector during the COVID period. According to the website Market Insider, The shift in the market competition can also be credited to the various mechanisms like price, rejectability, externalities for consumers and incentives for sellers that interacted freely in the market. These transitions can be analysed in detail by studying the features that they impact, thus leading to rapid transition from one form of competition to the other, adding to the existing uncertainty.

Through this paper, we will be addressing the descriptive and relational research problem of the form of market competition that existed in the pharma market during the COVID-19 pandemic in 2020. The article contends that the market had to transition at breakneck speed to be able to be able to sail through the crisis. However, this transition included the pharmaceutical industry rapidly switching between different types of competition. The industry became the price taker due to price gouging by the government. It was also seen that companies followed cooperation despite intense competition. Thus, this article supports the need for an umbrella term to highlight the market form seen during unprecedented times such as the COVID-19 pandemic.

Secondary data from books, journals and reports from think tanks including McKinsey was analyzed for research in this paper. Data published after various field works in this economic domain has been used to construct our paper.

Acknowledgement

As we begin to pen down the economic research that we have conducted on the basis of our knowledge, qualification and research , we would like to express our gratitude to all those who have helped us to complete and compile this study within the specific time frame. We would like to specially thank Mrs. Radha Bahuguna, who has been an essential part of our journey into the field of economics not just as a teacher but also as a constant source of reference through her book "Introductory Microeconomics - A textbook for class XI".

We would also like to thank our Critical Thinking Course Professors at Ashoka University, Professor Aditi Sriram and Professor Amaan Shreyas, who have taught us the fundamentals of research and guided us in detail about the methods of collecting information, forming a hypothesis and performing a detailed analysis of the data.

Lastly, we would like to thank all researchers whose study has helped us form clear understanding about the topic in consideration. We would also like to express our gratitude to our family and friends who have supported us throughout the process of the paper.

This paper has not just been written for competitive purposes, it has also helped us to stimulate our minds and learn from our surroundings, in order to become capable enough to conduct such research in future. Thus, this paper has been an integral part of our evolution as future scholars who try to create content that could help the society.

Khyaati Shailesh Tapadia, Saumya Seth and Sanya Seth
(Undergraduates at Ashoka University, Sonepat UG 23 Batch)

Introduction

As major countries stood at the brink of recession in 2020, industries and financial markets suffered due to the ongoing COVID-19 pandemic. In this dire situation, a factor that cultivated the productive and allocative efficiency in the market was 'competition'.

The question that this paper endeavours to answer is, "What form of market competition flourished in the pharmaceutical market in India, during the COVID-19 pandemic?" The primary assumption of this paper, on the basis of alike historical and anecdotal circumstances (SARS) is that adjustments in the competition policy by the government, to regulate market efficiency led to a shift in the form of market competition in the pharmaceutical market during the COVID period. To create a lucrative market for both entities, which include buyers and sellers, the government modified all policies related to factors including entry and exit of firms to price mechanism to homogenous products. These efforts of the government (injecting funds in the essential sectors of the economy, influencing the price mechanisms) were not concentrated in a specific direction, thus leading to a situation where no single form of market competition stood out and features of different competition types co-existed. This article will examine the aforementioned hypothesis by analysing the pharmaceutical market during different phases of the pandemic. Through the case study of the pharmaceutical industry, which saw unusual alterations in the demand and supply chain, we try to intuit the form of competition that existed in the market during the covid crisis.

According to Sandeep Garg, an economist, market refers to "the whole region where buyers and sellers of a commodity are in contact with each other to effect the purchase and sale of the commodity." The various market forms referred to in this paper include Monopoly, Monopolistic, Oligopoly, and Perfect competition. The type of competition for an industry is defined using multiple parameters including limited entry and exit barriers for companies, number of sellers and buyers, homogeneity in products, mobility of goods and factors of production.

A monopoly can be seen in India's pharmaceutical industry, as "branded generics dominate, making up for 70 to 80 percent of the retail market". In addition to that, "price levels are low" and are "driven by intense competition." India is the largest provider of generic drugs

globally. Indian pharmaceutical sector supplies over 50% of global demand for various vaccines, 40% of generic demand in the US and 25% of all medicine in the UK. The pharmaceutical market includes intermediates, drug formulations, AYUSH and herbal products, surgical and bulk drugs. Its technology contemporary biopharmaceuticals is expected to contribute to US $100 billion by 2025, with an average growth rate of 30%. The domestic pharmaceutical market shows promise as it attained a turnover of 1.4 lakh crore in 2019. While generic brands dominate the market, local companies have been deemed important players, and prices have remained low. Thus, due to the nationwide lockdown and global shutdown of transport and shipping in March, India faced disruptions in supply of about 70% active pharmaceutical ingredients (APIs) which it otherwise would have obtained from China, and exported to the United States.

This paper analyzes the trends in the personal protective equipment (PPE) market in India. The industry went from producing 0 PPE kits initially to 2.06 lakh PPE kits per day by May 5 to 4.5 lakh kits by May 18, within two months of the lockdown in 2020. The paper argues that the escalation in supply chain, followed by a de-escalation within the same year, shows signs of various market forms, while not falling under the category of any single form. Another instance is that of vaccine development, where it was noticed that despite functioning in a competitive environment, companies showed signs of cooperation.

Background

According to Eichenbaum *et al.* (2020), "people's decision to cut back on consumption and work reduces the severity of the epidemic, as measured by total deaths". In the paper titled "The Macroeconomics of Epidemics", Eichenbaum *et al.* proposed a SIR-macro model which resulted in sharp recession and few deaths. Countries including India followed a complete lockdown in the initial period since COVID-19 was deemed a pandemic.

The first major coronavirus outbreak had originated in 2002-03 in China. However, the scale of SARS 2002-03 pandemic was smaller than the SARS-COV-2 outbreak, given that "Covid-19 has killed more people than SARS had infected", as reported by India Today. However, the impacts of both outbreaks share a resemblance. Firstly, SARS and SARS-COV-2 belong to the family of Coronaviridae, and are able to cause severe respiratory diseases. In addition, the early symptoms including "fever, cough, headache, shortness of breath and

breathing difficulties", are shared by both. Given the geographical and biological similarities in both the pandemics, Caldaria *et al.* recommend that COVID-19 pandemic must be compared with the SARS outbreak of 2002-03 to "analyse infection trends and to find the right prevention and treatment measures". The former had taught a lesson to provide PPE kits to protect frontline and essential workers. Interestingly, India found itself on a shortage of PPE kits during the COVID-19 pandemic, which affected the country on a much larger scale than the SARS pandemic.

Economic repercussions of the 2002-03 pandemic include a "substantial decline in consumer demand, especially for travel and retail sales service". It also increased the costs of disease prevention, especially in the most affected industries" including the aforementioned sectors. Limiting international travel affects transportation of labour. The likelihood of getting infected was closely tied to the distance between two persons, thus one had to be careful while consuming as well as working. Thus, limitations were faced in international shipping due to lockdowns of work space and unsafe proximity and contact during transport of shipping of goods. It reduced international dependency and pushed the government to actively interfere in the pre-existing competition to support supply chains in various industries including retail and, travel and tourism. According to Lai and Tan, the government played an instrumental role in mitigating disease control through three measures, namely, "adaptive governance", "moral suasion" and "network partnership". Setting up a taskforce, communicating and building trust in the population, quick but steady steps to equip the healthcare sector, are some of the actions taken by the Singapore government during the SARS outbreak.

Given the crucial role played by the government during pandemics, and the lack of dependency on other countries, this paper presumes that the government actively adjusts the competition policy to regulate market efficiency, while the interest lies in reducing the number of deaths caused by the outbreak.

Literature Review

While venturing across the economic literature, attempting to answer our self constructed research question, we realised that prior to the observation of trends for the identification of the market form during COVID, we need to study about the markets and the factors determining market structure in some more detail.

Varied definitions of the term `Market' are celebrated and acknowledged in the economic domain. One such definition that provides us with a wider perspective to understand the working of a market is by French economist Cournot , according to whom

> "market is not a place in which things are bought and sold, but the whole of any region in which buyers and sellers are in such free intercourse with one another that the prices of the same goods tend to equality easily and quickly."(Cournot,1877)

This definition by Cournot highlights the significant way in which Buyers and Sellers (and their motives) dictate the market. Buyers' motive of maximising their utility and Sellers aim of maximising their profits are like the two sides of a see-saw that create a sort of competition in the market. This competition in the market may arise due to factors like profit motives, rejectability (availability of choices), externalities for consumers, incentives for producers or sellers. In addition to this, the website Marketing insider considers factors like concentration of the industry, structure of the costs, rate of market growth and entry and exit barriers as powerful drivers of competition in the market. Countless efforts of producers or sellers towards achieving this balance and competing with rival firms results in the formation of different forms of market structures, which are dependent on the factors that the firm deals with to secure its position.

The combined effects of the four main factors which are number of buyers and sellers, nature of commodity, mobility of goods and factors of production, and price determination determine the form of market structure and indicate the degree of competition in the market (Bahuguna,2018).

In our paper, we will also be comparing these market forms with the help of graphical representation of various market structures. For this the shape of the AR and MR curves will be the major tool for constructing and studying the market structures. On the basis of

the aforementioned factors the forms of competition that we will try to identify are perfect competition, monopoly, monopolistic competition, and oligopoly.

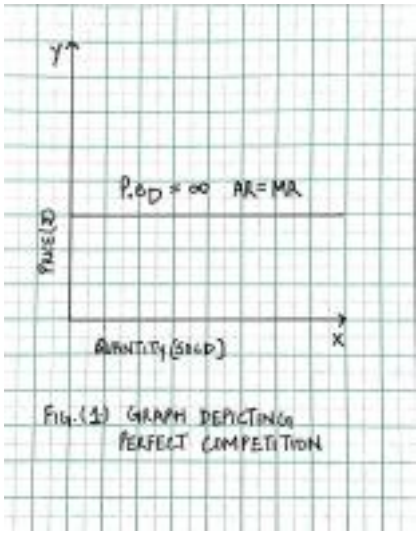


FIG. (1) GRAPH DEPICTING PERFECT COMPETITION

D.S Watson defines perfect competition as " a competition in which the number of firms is large, their products are homogeneous in addition, the firms have perfect knowledge of the market and resources are perfectly mobile. Some of the unique characteristics of perfect competition, that we extracted by studying the trends in the market are the perfectly elastic demand curve of the firm, equivalence of AR and MR curves (Check Figure 1.), firms are recognised as price takers rather than price makers.

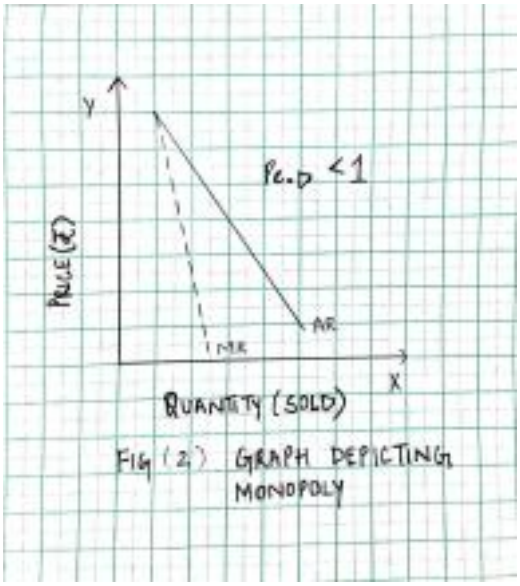
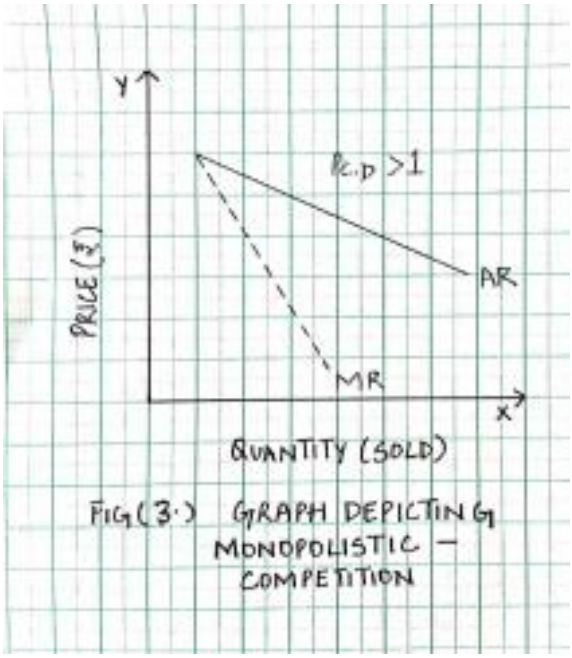


FIG (2) GRAPH DEPICTING MONOPOLY

A slight variation to this market form is presented by Prof.Chamberlin, who distinguishes pure competition from perfect competition on the basis of degree and not kind. In contrast to this market structure is Monopoly (figure 2.). The book `Introductory MicroEconomics', defines monopoly as " a market condition in which there is a single producer of a commodity with no close substitutes and there are institutional, legal and natural barriers for entry and exit of firms"(Bahuguna,2018). Example of this structure is the DeBeers company in South Africa that dominates 80% of world's diamond production, such vast control over resources is a sufficient condition for a firm to create a monopoly to dictate its terms and quote their own prices (price maker).



FIG(3.) GRAPH DEPICTING MONOPOLISTIC - COMPETITION

On a similar line, lies Monopolistic competition (Check Figure 3.), a form of market structure which is described as a "mixture of mini monopoly and tough competition" by the official website of Pressbooks. It resembles monopoly structure in the sense that firms have control over trade marks and is sort of a tough competition because firms are in a neck to neck competition between large numbers of firms which sell differentiated products. Special characteristics of firms under monopolistic competition are that the firms compete with each other without changing the price of commodities, this is known as Non price competition and such firms are neither price takers nor price makers.

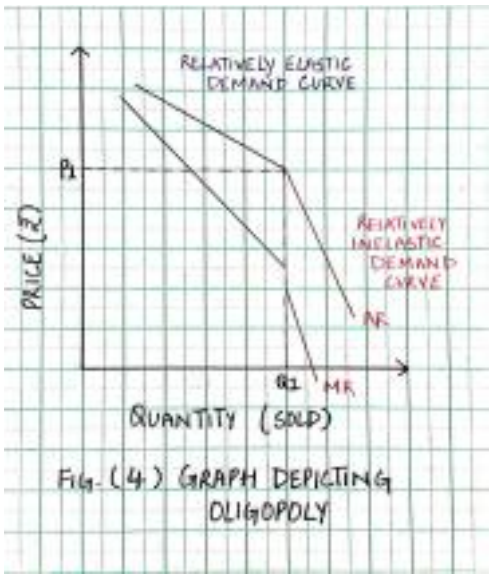


Fig. (4) GRAPH DEPICTING OLIGOPOLY

Another form of market structure which is a combination of two forms is Oligopoly(Figure 4.). Markets for automobiles, cement, steel in india are examples of such structure. This form of market lies between monopoly and monopolistic competition. Radha Bahuguna, an economics teacher, in her book 'Introductory MicroEconomics' writes, "Oligopoly is a market form of imperfect competition with few firms operating on a big scale of a commodity and producing a substantial part of total output of the industry". In this form of market firms are interdependent and price and policy decisions are taken according to rival firms or competitor sellers.

While the study in the paper specifically involves the Pharmaceutical sector, its results may also apply to other goods which experienced a rise in demand during the pandemic. Our research paper contends that the market had to transition in the supply and demand chains, export and import volumes, direct communication to tele-communication or tele-medicine at breakneck speed. However, this transition included the pharmaceutical industry rapidly switching between different types of competition. The industry became the price taker due to price gouging by the government. It was also seen that companies followed cooperation despite intense competition. Thus, this article supports the need for an umbrella term to highlight the market form seen during unprecedented times (period in which competition and cooperation coexist, no from of competition exists in isolation, exports and imports are declining, demand and supply chain disrupted, influencing the price of products depending on demand is restricted, government intervention in play

rather than natural equilibrium determined by factors of demand and supply, homogenous products rather than differentiated ones and no definite shape of the AR and MR curves can be analysed) such as the COVID-19 pandemic The goods might belong to industries including Fast Moving Consumer Goods (FMCG) and others which cater to necessities of the people or might also include giffen goods. This paper is limited to the study of those products that were essential during COVID like masks, sanitisers, PPE kits and the paper excludes the effects on market competition of those products which are not required for use during pandemic, for example, the usage of automobiles decreased and even luxury items like jewellery had a decreased demand. This might be because people tried to minimise their expenditure and increase their savings during the pandemic. So, they tried to optimally utilise their funds through prioritizing their needs and spending accordingly.

Methodology

The descriptive and relational research problem that our paper attempts to solve is identification of the form of market competition that flourished in the pharmaceutical industry during the pandemic and ensuing economic crisis. The qualitative and quantitative data used to introduce the new form of competition is from secondary sources including books, journals and articles that were published on official websites of Biopharmaceutical companies like Mckinsey and Deloitte. From a research point of view the analysis of the market is done by dint of gathering observations without our personal intervention in the topic related to our study and field work. The basic approach to answer our research question would be a thematic and content analysis of the market trends by observing shifts in market forms during various phases of the COVID crisis.

Conclusion and results of field studies conducted using triangulation method which is `concoction' of various types of field work methods have also helped us to introduce the new form of market using tabular and graphical representations.
Initially we had planned to identify the forms of market in each phase of the pandemic independently but lack of official data due to the recency of the issue, as COVID 19 pandemic is very novel and recent.

Analysis

While the country and its economy lay with exhaustion and agony under the shackles of one of the worst biological crises witnessed by human kind, it was the pharmaceutical sector that brought India back to its feet. The pre- eminent position that pharma has secured in the pandemic is not just based on the necessary medication that it provided but also because it has acted as a booster for the economy. However, this sector also experienced some surprising movements when it comes to the type of competition in the pharmaceutical market. To demystify these movements, we would consider two examples from the pandemic.

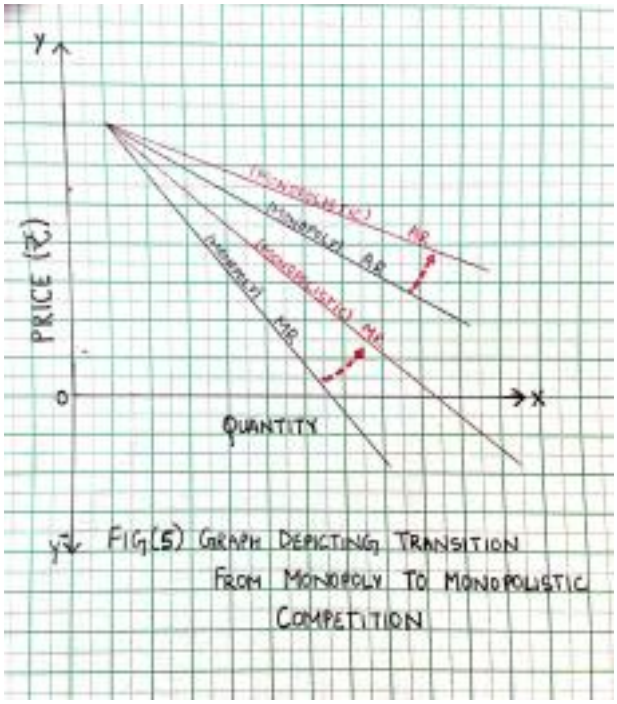
The first is a case study of the production of PPE kits in India during COVID. This case study aims to depict how the market transitions rapidly from one type of competition to another, during uncertain times. The second case study covers the phase of vaccine production in India, in the context of the buyers and the sellers. This case study throws light on the market condition when features from various types of market competitions come together simultaneously within the same industry. It shows how a concoction or a mix of competition can be observed during the COVID-19 vaccine research.

(i) Production of PPE kits in India- (The rapid transition of the forms of competition)

When the pandemic began unleashing its wrath on the country, India was medically ill equipped and the lack of PPE kits worsened the problem. Even the disruption of foreign supply of PPE pushed India towards the spike in PPE cases. However, due to government intervention through investment, within two months of the lockdown in 2020, from producing 0 personal protective equipment (PPE) kits, India went on to produce 2.06 lakh PPE kits per day by May 5 to 4.5 lakh kits per day by May 18. The suppliers grew from 52 certified companies to 600 certified companies in the same duration, marking a huge spike in the supply chain. Being an industry that was born due to, and in the duration of the pandemic, personal protective equipment (PPE) industry shows the impact of the pandemic on industries with government support. By July, India had exceeded domestic demand, followed by an excess supply in December that caused more than 100 manufacturers to shut down. While increased competition led to innovation as cheaper alternatives and varying quality products emerged, suppliers also faced a rapid decline in demand. It can be inferred that from a single seller in the market and a large number of buyers, the industry

moved to a market that has both a large number of buyers and sellers, within a few months. Thus, this transition can be economically analysed to see the number of buyers and sellers involved in the market, conveying a transition from a monopoly to a monopolistic style of competition.

The figure (5) depicts the transition from monopoly to monopolistic style of competition using AR and MR curves. These are downward sloping curves as they depict how the price is reduced in order to sell more. The difference between the monopoly and monopolistic graph is that the latter is more elastic as compared to the former, because in a monopolistic style of competition close substitutes of the products are available. Hence, PED< 1 in a monopoly but PED> 1 in monopolistic style of competition. (PED stands for Price elasticity of Demand).

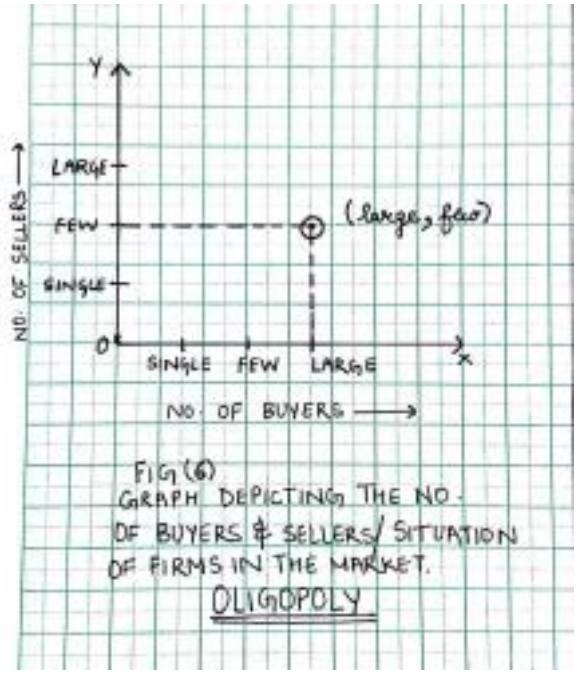


(ii) The production and development of vaccines - (Co-existence of several types of competition)

Apart from the market trend of transitioning to different types of competition, the pandemic also witnessed co-existence of features of different competition types. This means that a single industry, within a particular period of time, witnessed intermingling of several competition types. The detailed analysis of the market during the production and development stage of the vaccine will help to prove the aforementioned hypothesis.

To understand the type of competition we study the following features:

Entry and exit of firms: The whole nation was going berserk with the anxiety, awaiting the invention of a vaccine but we observed that only a limited number of firms could experiment in the field of vaccine invention. This was mainly due to the huge amount of investment required. The perturbing concern was also the uncertainty of success that made such exorbitant expenditure risky during the existing crisis. Thus, the limited entry and exit of firms in the market makes it an **"oligopoly"** type of market competition. Where only a few large players with enough funding and licenses can enter the market. Refer to graphical presentation in Figure 6.



Type of product: Since the decision of the type of competition existing in the market requires analysis of various features, when we study another feature that is the type of product that the market is selling, namely the vaccine, we see that the product is differentiated (i.e. slight variations in the successful vaccines) but there are close substitutes available for the same. Hence this kind of product is a feature of the **monopolistic** market.

Price: The study of the pricing policy presents yet another dilemma, where we could say that again two competitions co-exist:

(a.) The firms during a crisis try to avoid price wars, so firms follow the policy of price rigidity . Therefore, irrespective of conditions created by the market mechanisms, the price tends to remain more or less fixed. This means that the firms keep the price of their product within close range of the price of other rival products i.e. its close substitutes, in order to avoid price wars. This comes under the **feature of oligopoly** where there are a few large firms in the market and each firm's contribution is significant for the market.
(b.) Though the claim of constant prices, stated above seems to be true in this case too, the reason for it is different. It is because the reason for fixed prices can also be government intervention that is through price gouging. Hence in this case the firm becomes a price taker rather than a price maker. This is a **feature of perfect competition** that can be witnessed during uncertain times, as a move of the government to avoid price surging. Refer to the Graphical Presentation in Figure 7.

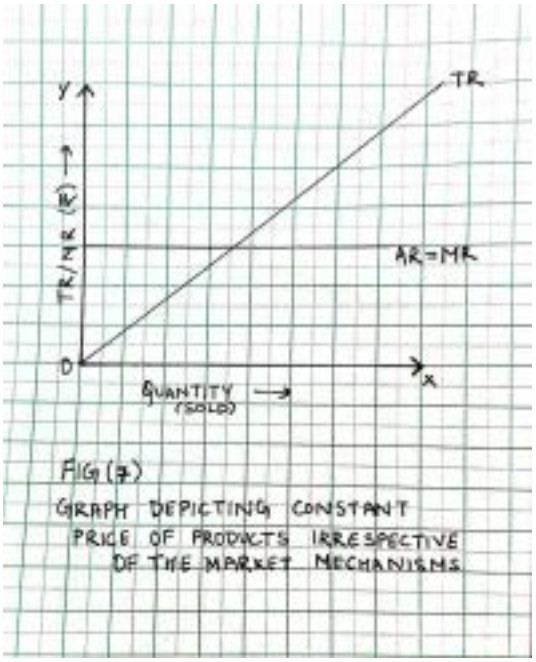
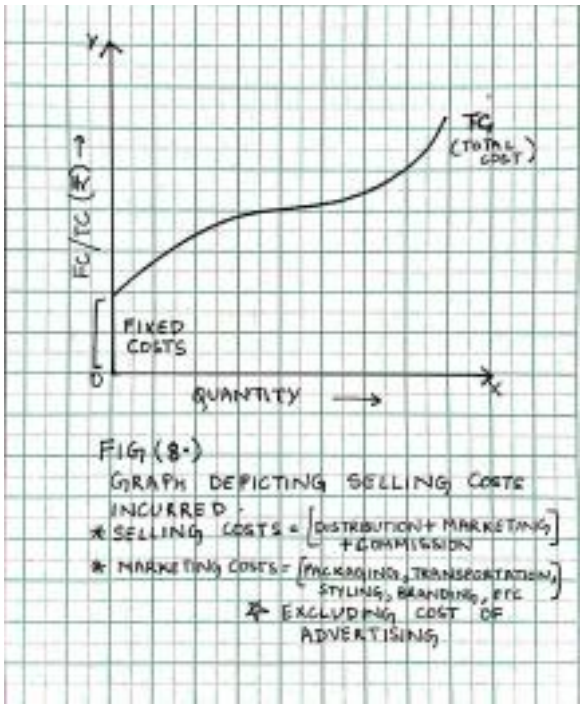


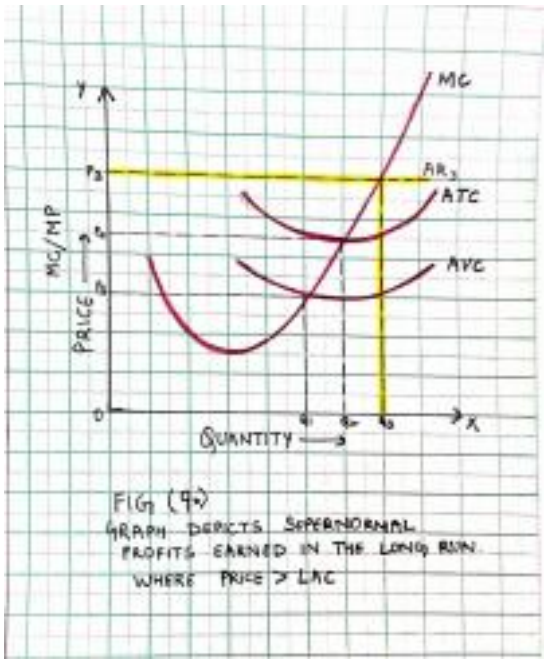
FIG (7)
GRAPH DEPICTING CONSTANT PRICE OF PRODUCTS IRRESPECTIVE OF THE MARKET MECHANISMS

Selling Costs involved: If we continue to analyse, yet another feature i.e. the selling costs involved in the market, the result is still a new form of competition. Because the limited or somewhat zero cost involved in selling the vaccine shows that the market experienced **monopoly,** because the very limited costs were just for the purpose of informing the buyers, and none of the firms considered spending money for advertising. While the selling expenses = (Distribution + Marketing costs + Commission), the marketing costs here in our case are assumed to be the packaging, transportation, styling, branding, etc excluding the cost of advertising. Refer to Figure 8.



Knowledge about the market: Buyers and sellers in the vaccine market possess perfect knowledge. Both of them were aware of the price gouging measures being enforced with the intent of keeping the growing monopoly inclined towards **perfect competition** . Thus, no buyer offers a higher price or no seller proposes a higher selling price than the one which has been agreed upon through government regulation or through the cooperation among the pharma fraternity.

Profit in the long run: The large firms involved in vaccine invention and production earn supernormal profits in the long run. This means that profit would be over and above the normal profit i.e. **AR Average revenue** = **ATC Average total cost**. So the supernormal profit is calculated as **Total Revenue** – **Total Costs**, where the costs include the minimum income required by the seller. This is also a feature of **oligopoly**. Refer to the graphical presentation in Figure 9.



Thus, the above ` Feature by Feature study of the vaccine situation shows how in uncertain times different features of the market react differently, thus leading to a situation where no single form of market competition stands out.

The following is a tabular presentation to summarise the analysis of the market competition during the phase of vaccine development and production:

Number of Buyers and Sellers	Few Sellers, Large no. of Buyers	Oligopoly
Product	Homogeneous/close substitutes	Monopolistic

Knowledge about market	There is no concept of consumer preference	Perfect
Price	a.) Price gouging b.) Price Rigidity	Perfect Oligopoly

Entry and Exit of Firm	Restricted due to huge investment required and licensing procedures	Monopoly
Selling Costs	Negligible advertising costs involved, if involved it is only for the purpose of informing the buyers not for promotion	Monopoly
Profit in the Long Run	Supernormal profits, Price> LAC	Oligopoly

Results and Explanations

Efforts of sellers, government and competition agencies to improve the market condition in face of the pandemic ensuing economic crisis were not in a specific direction which did not allow any one form of market structure to exist in isolation. This resulted in what we have coined "Concoction Competition"(Refer to Figure 10.), a form of market structure in which large no of buyers and sellers (oligopoly) compete to sell differentiated yet close substitutes of products at prices which do not change depending on the demand as they are fixed due to price rigidity and price gouging . Additionally we have analysed that in this form of competition entry and exit of firms is restricted due to huge capital investments required , limited availability of strategic resources required for production of goods and limited patents and licences being provided to firms.

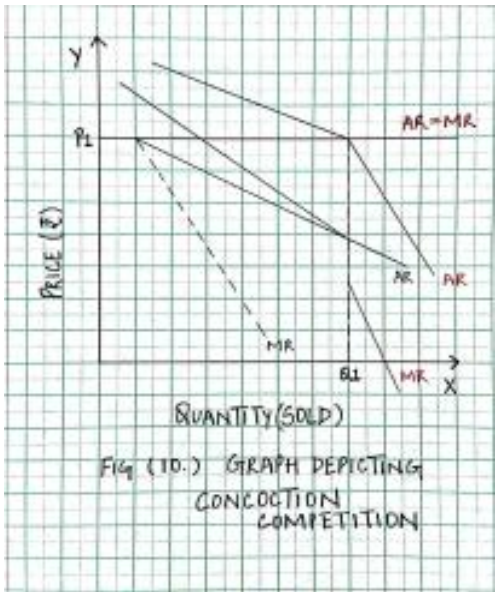


FIG (10.) GRAPH DEPICTING CONCOCTION COMPETITION

Conclusion

From the above analysis, the paper finds that not only did various forms of competition co-exist and form a Concoction Competition, but also the market rapidly transitioned between various market competition structures in a short span of time of 2020. The term concoction competition is more than an alliteration, it refers to a form of competition existing in unprecedented times of a pandemic. Unprecedented times refer to a context where demand and supply chains are disrupted and sellers are trying to squeeze opportunities to gain profit but taking into consideration the cost of inconvenience that might be caused to the buyers. Further research may be done to determine the market type in other unprecedented and unique situations including wars and financial crises. While there is no straight jacket solution or strategy to crisis modified market, the establishment of a pattern may guide governing bodies both nationally and internationally to equip the economy to be able to face a future pandemic.

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