आपूर्ति

ATHASHASTRA
THE ECONOMICS SOCIETY

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THE ANNUAL ECONOMICS JOURNAL

To

everyone who has been forced out of the formal education system; children forced out of school; students forced to drop out of school or university; everyone making an effort to make education more inclusive and accessible.

This year, we moved to a new decade - the 2020s. One very important challenge that we are carrying forward to this new year and the new decade is the problem of making education accessible and inclusive for all. In this outgoing academic session, editors participated in multiple research projects and took up an initiative in this direction. One editor participated in the research project titled: *Schooling and Child Labor among Street-Children: Evidence from Urban India,* which aims at finding the right intervention to make street children go to school. Editors participated in a year-long RCT, monitoring and analyzing the placed intervention on Environment education in schools.

With the help of many kind and genius personalities from the world of Academia, we were successfully able to launch the Educational Initiative on our blog, Ecotalker. The initiative is an open-access platform for students (in or out of formal education) to learn about various domains and the latest developments in Economics from the best minds of the world.

As Professor Ariel Rubinstein puts it, "*Remember that you are one of the most privileged people on earth. Society has given you a wonderful opportunity. You are supposed to do whatever you want, to think about new ideas, to express your views freely, to do things in the way that you choose, and on top of that, you will be rewarded nicely for doing so. These privileges should not be taken for granted. We are extremely lucky, and we owe something in return."* (1) We would like to dedicate the 10th edition of Aapoorti to everyone who was forced out of formal education.

The Editorial Board

1. Rubinstein, A., 2013. 10 Q&A: Experienced Advice for "Lost" Graduate Students in Economics. *The Journal of Economic Education*, *44*(3), pp.193-196.

Faculty Advisor's Note

Aapoorti, which enters its tenth edition this year, was started by the students of the Department of Economics. In the past decade, it has been driven by a team of dedicated students who have built a self-sustaining organizational structure with senior students mentoring their juniors and passing on invaluable skills in the process. Each year the team starts early on in the academic year, collecting articles and contributions for the journal from all over the country and abroad. Eminent economists and commentators are interviewed and their opinions sought on a wide range of issues and research methods.

This year is no different. Apart from the University of Delhi, contributions have come in from the Indian Statistical Institute, Delhi, St. Xavier's, Kolkata, St. Xavier's, Mumbai, Ambedkar University Delhi and also Tev University, Israel. With each year the journal has extended its reach to an increasing number of institutions but has also brought in a large canvas of topics, many of them at the frontier of research. From Sports Economics to Water Investments, this year's edition even includes an article scrutinizing the role of economists and questioning their survival in the future!

I congratulate the students on this accomplishment of completing a decade and hope that the journal marches on its journey into excellence and continues to bring to the reader a compilation that the Department of Economics is justifiably proud of.

Dr. Malabika Pal,

Faculty Advisor, Arthashastra

Teacher-in-Chage's Note

The Department of Economics provides a platform to our young scholars to interact and share their beliefs and diverse opinions about a range of economic issues. Their collective effort, knowledge and enthusiasm has helped in the creation and growth of Aapoorti. Every year the students focus on a new economic matter that mirrors the current mood of the nation.

Quite aptly, this year the central theme of the journal is Political Economy, a branch of economics that reflects the amalgamation of power and authority, and optimal use of scarce resources. Political institutions play a crucial role in shaping economic performance of a county. How far will politics affect development; do historical institutions matter in present times; how to analyse the role of elections, collective action, conflict, corruption, etc. are some aspects that political economy focuses on.

Keeping the central theme in mind, team Aapoorti has interviewed three eminent economists and distinguished professors ranging from Prof. E. Somanathan and Prof. Arunava Sen from ISI Delhi and Dr. Subramanian Swamy, (politician, economist and Rajya Sabha member). The journal also includes research papers from various colleges across University of Delhi and from ISI Delhi, Ambedkar University Delhi, St. Xavier's Kolkata, St. Xavier's Mumbai, and Tel Aviv University Israel.

Aapoorti as a journal has grown from strength to strength. This would not have been possible without the dedication of the editorial team throughout the year. I am positive that they will continue to march towards excellence. I also congratulate all the student contributors for their submissions that have made this journal a success. I wish them all the best and hope that Aapoorti has been a stepping stone that will help them progress further as researchers.

Dr. Hena Oak

Teacher-in-Charge

Acknowledgment

Compiling a journal like Aapoorti is a team effort of many determined and sincere participants. First and foremost, we would like to thank our Faculty Advisor, Malabika Pal ma'am, and Teacher-in-Charge, Hena Oak ma'am for their continued support and encouragement. We are blessed to have helpful teachers like Neetu Chopra ma'am who ensured that we had the best experience with the interviews. We extend our sincere gratitude to our faculty for guiding us through this long and often, an intense process.

This journal would not be what it is without the dedication and unceasing effort of our in-house Marketing Team, the Design Team, the Vishleshan Team, and the Sponsorship Team. They delivered on their suggestions and contributed immensely to the making of Aapoorti.We are grateful to Mr.Vishal Verma and Ashish Puri for helping us with formatting and delivering their valuable suggestions. This edition's cover has been designed by Niharika Dayanand. The cover truly captures the essence of this year's theme, Political Economy, visually.

We are indebted to our contributors from various colleges for their insightful submissions and our lovely readers for their never-ending support. We are incredibly grateful to our interviewees for their time and for participating in this annual educational exercise. To everyone without whom this edition would not have come into being, we thank you for your kind support.

With gratitude,

The Editorial Board

Editors' Note

As Aapoorti enters its tenth edition, we cannot help but feel a sense of achievement looking at how far the journal has come. From talking about the Millenium Development Goals (MDGs) in 2011 to evaluating the relevance of economics in the twenty-first century this year, Aapoorti has maintained an unchanging focus on excellence and continued its tradition of pertinence.

Our theme for the tenth edition of our journal is the 'Political Economy'. The world has always been characterized as a place where the only constant is change. Of late, however, the world, and the global economy, in particular, has witnessed frequent disruptions; the Golden Bird's slowdown, the exit of the United Kingdom from the European Union, the recent Coronavirus outbreak in China and a multitude of other events. It becomes intuitive, then, to explore and analyze the relationship that political and social institutions share with the economy. Our editors this year have answered questions as deep and fundamental as 'What is the Free Market?' and used fascinating tools such as Evolutionary Game Theory to analyze the problems of the political economy. We have attempted to bring in heterogeneous perspectives on issues as contentious as government intervention in the free market, and we hope that they add nuance to your views on the same.

We have received papers from eminent national and international institutions, such as the Indian Statistical Institute, Delhi. We have also interviewed great economists and loving professors such as Dr. Arunava Sen, Dr. E Somanatham, and Dr. Subramaniam Swamy, enriching this edition with a wealth of knowledge and perspective on the discipline of economics.

We hope that your travels through the pages of this journal are as enjoyable as our experiences while creating and compiling them. Our readers have been our priority throughout this process, and we sincerely hope to present you with a comprehensive and original journal.

With warm regards,

The Editorial Board

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EDITOR'S DESK

Caste, Class & Gender: A Trilogy

Devika M. & Mita Chaturvedi

Abstract

Gender and Caste-based discrimination have plagued India's women for eons. Through the course of this paper, we shall attempt to dive into the lives of India's lower caste women and analyse their lives through a social and economic lens. We will look at different factors, such as education, access to basic amenities, society, freedom, etc. to highlight the inequality that all women, but especially lower caste women face in spite of measures supposedly taken by the government. We will be looking at both rural as well as urban India for our analysis. We will culminate this paper with a brief look at some shortcomings.

Introduction

Liberté, égalité, fraternité- are ideals enshrined in the constitution of India. In applying these great ideals, various governments across periods have brought up policies, schemes, measures to ensure that all its citizens experience these ideals to its fullest. While decisions are mostly taken in good faith- they often don't always solve problems. These problems not only tarnish India's reputation but also hinder the country's scope for economic growth and development.

One such problem that continues even today is the nation's treatment of its women.

A 2018 report by the McKinsey Global Institute shows that India could add up to $770 billion—more than 18%—to its GDP by 2025, simply by giving equal opportunities to women. Unfortunately, India has seen a long history of women not enjoying the same rights and privileges as men. From parochial social practices such as *Sati* and child marriages to programs and campaigns aimed at educating the girl child- women in India have seen their share of ups and downs. One highly visible indicator of this is the terribly skewed sex ratio in most Indian states- especially the Northern states. This ratio stems from the country's age old preference for the male child, resulting in not only the distortion of the gender ratio but also in the reduction of resources available for the female child (underprivileged families may tend to divert funds to educate their male child whilst wholly ignoring their girl child).

This inequality also displays itself in the workplace where India is infamous for women having fewer professional jobs than their male counterparts. As per research backed by McKinsey, 97% of all female workers in India are active in the informal sector, in low paying activities and domestic work.

As it may appear, women do face various forms of hardship and discrimination in India- something that is immensely affecting the nation's reputed culture and economic development. Nonetheless, many claim that certain indicators have shown an incredible level of involvement of women in many sectors, leading to considerable improvement in reaching gender inequality. We now have government involvement trying to come up with policies aimed at curbing gender inequality in India. In fact, it

is the result of such concerted efforts of people, policy and the country's changing mindset that India's women now see themselves living in better situations, with scope for improvement.

Now, in this discussion of women in India, we must ask ourselves one incredibly pressing question:

Do all women in India face the same struggles?

Or, in other words- even if the average Indian woman's life has gotten much better, can we just as easily call it better for *every* Indian woman?

Let's bring up a relatively new but highly talked about term- intersectionality. Coined in 1989 by Professor Kimberlé Crenshaw, intersectionality serves to describe how characteristics such as race and gender 'intersect' and overlap. The term came to be what it is now because of the pressing need to broaden the reach of mainstream feminism to include the needs and wants of women from every race, section and class.

One widely provided example to describe the need for a discussion on intersectional feminism is of the dissimilarity in wages earned, in the United States, by men and women (for every dollar he makes, she makes 80 cents), and how this gap widens when women of different races enter the picture. For every dollar a man makes in the US, an Asian-American woman makes 85 cents, Caucasian woman makes 77 cents, an African-American woman makes 61 cents, Hispanic or Latina women make 53 cents and Native American women make 58 cents. In order to highlight such differences that go beyond gender and tackle the issue of inequality is why intersectionality and intersectional feminism is so widely talked about in contemporary politics, and it is for the same reason that our focus shall now turn to intersectionality in the Indian framework.

Social Factors:

Education

From families marrying their daughters off instead of allowing them to be educated to policies like Beti Bachao Beti Padhao, female education has come a long way in India.

Literacy Rate

According to the 68th NSS round, the overall literacy rate in India (considering those above the age of 5) was 74.1%. This essentially means that 74.1% of Indians were able to both read and write and comprehend a simple message in at least one language. At the all-India level, the estimated literacy rate was the highest among those in the 'general' category (83.2%), followed by OBC (72.8%), SC (67.4%) and then ST (64.8%).

A similar trend is followed for female education. More men in India are literate than women. As per the above mentioned NSSO data, female literacy rate was 17.5 percentage points lower than that of male literacy rate in rural India. This differential also varied across different social groups- with female literacy being 19 percentage points lower than that of male's for SCs, 18.5 percentage points lower for OBCs, 17.7 percentage points among the ST population and finally, 13.9 percentage points among the 'others' category.

Urban India saw female literacy rate being 16 percentage points lower than male literacy rate among the SC population, 14.3 percentage points among the ST population, 11.6 percentage points lower in OBCs and finally, only 6.8 percentage points lower in the general category.

Statement 3.12: Literacy rate among persons of age 5 years and above for different social groups in NSS 61st (July 2004 - June 2005), 66th (July 2009- June 2010) and 68th (July 2011-June 2012) rounds

all-India

social group	rural			urban			rural+urban		
	male	female	person	male	female	person	male	female	person
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
61st round (2004-05)									
ST	603	395	501	828	658	743	624	420	524
SC	645	426	538	813	607	715	679	461	573
OBC	718	489	605	850	704	780	749	537	645
others	800	629	716	919	839	880	846	709	780
all (incl. n.r.)	712	502	609	875	751	816	755	566	663
66th round (2009-10)									
ST	701	526	615	880	720	804	717	544	631
SC	721	523	623	831	691	764	743	555	654
OBC	780	575	679	886	753	822	808	621	716
others	842	685	767	935	860	900	879	757	821
all (incl. n.r.)	773	585	682	900	789	848	811	640	728
68th round (2011-12)									
ST	714	537	627	872	729	806	733	558	648
SC	735	545	643	862	702	785	763	580	674
OBC	779	594	688	887	771	832	809	642	728
others	849	710	781	934	866	902	885	775	832
all (incl. n.r.)	780	605	694	903	799	853	816	661	741

Source- NSS Report No.563: Employment and unemployment situation among social groups in India

Despite the abysmal gender gap in literacy rates, the above table highlights that upon comparing literacy rates from 2004-05, it is made evident that female literacy rates (across all regions and social groups) are increasing much faster than male literacy rates- an indication that the gender gap is getting narrower.

Distribution by Educational Level

Now we look at discrepancies in education based on gender and caste. For this, we have looked at NSS data for people aged 15 and above.

The data shows that the percentage of those who were not at all literate was lowest among the unreserved population for both females and males in both rural and urban areas. Conversely, the same rates were highest among India's ST population for both males and females in rural areas, and highest among SCs regardless of gender in urban India. Even then, lower caste women have the worst share- with ST and SC women having the highest shares of illiteracy pan-India (56.7% of rural ST women and 34.4% of urban SC women were found to be illiterate) and the lowest rates of graduates and postgraduates (1 out of 1000 SC women in rural India was found to have a postgraduate degree as compared to 10 women from the general category). In short, levels of education all over India have been lower for women than for men, but women from lower castes (especially SC and ST women) have had it worse.

Attendance Rates

We will now look at current attendance rates, which is defined as the number of persons currently attending an educational institution per 1000 of a given population.

In rural areas, the current attendance rate among women aged between 5-14 years was the highest (at 91.5%) for those under the 'others' category, followed by 88.1% for OBCs, 87.9% for SC women and least for ST women (at 87.5%). In urban India, among females, the rate was the lowest among SC women (at 90.8%) and highest among the non SC/ST/OBC women (at 95.1%).

Among women in the age group 15-19 years, we see a dramatic decline in current attendance rates- especially for women. This is perhaps due to factors such as poverty (due to which families are unable to afford senior secondary or higher education), bias towards educating the male child, or early marriages of females. In rural areas, the current attendance rate among women aged between 15-19 years followed a similar pattern to the previous age group- the highest (at 63.1%) was for those under the 'others' category, followed by 55.1% for OBCs, 50.2% for SC women and least for ST women (at 46%). In urban India, among females, the rate was the lowest among SC women (at 64.3%) and highest among the non SC/ST/OBC women (at 75.1%).

These values are even lower for women aged between 20-24 years, with rates being as low as 6% for rural-living ST women and as high as 15.6% for rural-living women under the 'others' category. One anomaly to this pattern appears in the rates of urban women in this age group where while the highest rates are of women under 'others' (at 32.3%), **ST women** come next (at 27.4%), followed by OBC (21.3%). SC women still have the lowest current attendance rates (at 18.4%).

Health & Demography

India's Dalit population is lagging in demographic transition *(Mukherjee, Sabharwal-2015)*. Hence, fertility and mortality rates in all age groups are higher in this social group as compared to the non-SC/ST population. Also extremely high are infant and child mortality rates, as indicated in the table below.

	SC	ST	OBC	Others	Total
Infant Mortality Rate (IMR)	66.4	62.1	61.1	55.7	57.0
Neo-Natal Mortality Rate (NMR)	46.3	39.9	42.1	38.1	39.0
Child Mortality Rate (CMR)	23.2	35.8	18.7	13.3	18.4
Under Five Mortality Rate (U5MR)	88.1	95.7	78.7	68.2	74.3

Source- National Family Health Survey (NFHS) 2005-06

Another rising worry is that of underage marriages. A significant number of SC women are underage brides (i.e. they are married while under the legal age of 18). This is highly prevalent in northern India, especially in Rajasthan, Uttar Pradesh and Madhya Pradesh. However, even places that otherwise have a higher mean marriage

age (i.e. most North-East states, Jammu & Kashmir, Kerala) record a reverse trend among SC girls, with a considerable number of these girls being married before they turn 18. This has been further inducing adolescent pregnancies, which has a detrimental effect on the health of these young women.

Percentage of Married Men and Women under the age of 18 (2011)			
	Age Group	Male	Female
All	15	2.7	7
	16	3.2	8.6
	17	3.8	14.0
SC	15	2.6	6.8
	16	3.0	8.8
	17	3.6	15.0
ST	15	3.6	6.9
	16	3.4	9.3
	17	4.7	16.1

Source- Census 2011

Health has always been an indicator very closely linked to socio-economic conditions. In a caste-divided land such as India's, it comes as no surprise that India too is bound to have varied health conditions and facilities depending on social groups. Surprising, however, is the extent to which these facilities are varied.

For this analysis, we will solely be looking at female health across all social groups.

Access to Facilities

The United Nations Millennium Development Goal incorporated eight goals which all UN member states had agreed to attempt to reach by the year 2015. This included aims such as combating poverty, hunger, disease and discrimination against women. One of India's biggest hurdles in meeting these goals was the highly prevalent socio-economic disparity in the access to healthcare facilities.

Percentage of women with less than 3 ANC visits					
	1992-93	1998-99	2005-06	1992-93 to 1998-99	1998-99 to 2005-06
SC	63.55	61.70	54.12	1.84	7.58
ST	71.48	71.63	59.28	-0.15	12.35
Others	52.66	50.24	36.41	2.42	13.82
All India	55.87	55.49	47.61	0.38	7.87

Source- NFHS 1, 2 & 3

The percentage of women having fewer than 3 antenatal care (ANC) visits has declined with time across all social groups. The SC population saw a slight decrease of 1.84% from 1992-93 to 1998-99 and a decrease of 7.58% from 1998-99 to 2005-06. Amongst women, the percentage of women with less than 3 ANC visits initially rose slightly until 1998-99, after which it showed a substantial decline. Despite this considerable decline, the percentage of ST women with less than 3 visits is still the highest as compared to any other social group, with SC women next in line. This, coupled with the fact that SCs did not see a very large decrease (7.58%) from 1998-99 to 2005-06, is indicative that most SC women still do not have access to three or more ANC visits.

Time of Receiving Post Natal Care After Delivery					
	Less than 4 hours	4-23 hours	1-2 days	3-41 days	No Check Up
SC	23.7	3.9	4.8	3.8	62.9
ST	16.3	2.3	4.4	7.4	68.6
OBC	26.4	4.5	4.7	3.7	59.8
Others	34.5	7.0	6.1	3.3	47.4
All India	27.3	4.9	5.1	3.9	57.6

Source- NFHS-3 Report

The percentage of women receiving post-natal care (PNC) has increased from 31.2% to 42.8% *(NFHS 2-3)*, however, women of higher castes are more likely to be able to access PNC than women belonging to a lower caste. In spite of the rising number of women accessing PNC, SC and ST women still lag behind. More than 60% SC and ST women (the latter being closer to 70%) do not receive any PNC after giving birth. Furthermore, only 24% of SC women and 16% of ST women receive any care within 4 hours of having a child, as compared to 35% among non SC/ST/OBC women.

Decision Making in Healthcare Facilities

Decision Makers					
	Woman Alone	Respondent Jointly with Husband/ Partner	Husband/ Partner Alone	Someone Else	Other
SC	29.17	33.97	30.06	5.54	1.26
ST	24.68	35.02	35.77	4.09	0.45
OBC	24.63	35.24	30.13	8.44	1.55
Others	29.68	35.74	28.78	4.73	1.08
All India	27.14	35.15	30.13	6.33	1.25

Source- NFHS-3, 2005-06

Very few Indian women have the power to make independent decisions regarding their own health. Among OBC and non SC/ST/OBC households, it is more common for women to make decisions jointly with their partners rather than not have a say at all. This, however, is not the case for SC and ST women, who are likely to have absolutely no say in their own health (with their significant others making their decisions for them). In some cases, someone else (in many cases, in-laws) make health care decisions for women.

Voice and Violence

The Indian constitution provides several legal safeguards to SC/ST people to shield them against the atrocities committed against them. However, even today a large number of SC and ST men and especially women face scores of violence. Women belonging to lower castes face discrimination on two grounds- gender and caste. Not only are they exploited in the name of caste but are also vulnerable to sexual exploitation.

Another horrifying form of torture and violence is that of witch hunting. Even in today's day and age, there exist villages that have branded for ages and continue to brand poor SC and ST women as witches- leading to either these women being exiled or in some cases, even killed. As per various newspaper reports, around 2556 women have been killed in India in the name of witch hunting between 1987 and 2003 (Meena Kandasamy, 2011). Despite the aforementioned legal safeguards, victims of atrocities (especially women) hardly get justice due to institutional prejudices and social stigmatization of victims of sexual assault.

A survey conducted on 500 Dalit women revealed that 62.4% faced verbal abuse from both uppercaste men and women, 54.8% faced physical assault, 46.8% faced sexual harassment and 43% faced domestic violence. These women were likely to face such atrocities in three places- public places, in their own homes (due to relatives) and in government places (i.e. police stations, etc.). In less than 1% of these cases were the perpetrators convicted by courts; in 17.4% instances, the women saw justice being obstructed by the police; and in 26.5% of the instances, justice was obstructed by either the perpetrators or supporters (or the community) of the perpetrators. Moreover, in over 40% of these cases, there was no attempt for legal or communal justice solely due to the stigma surrounding victims of such atrocities. These women refused a chance at justice in order to avoid being 'dishonoured'. Many women decide against going to the police or to court due to their belief that they would not receive justice.

Economic Factors:

There's nothing better than economic freedom. When women have adequate finances for themselves, they are in the right positions to make decisions as her choices aren't influenced/dependent upon others. For e.g, we know for a fact that most women stay in violent/unhappy marriages as they are scared of their future economic prospects if they leave said marriages. Keeping that in mind, we explore the following economic factors.

Unemployment

A growing trend in the current scenario, unemployment has hit everyone in India. While studies show the unemployment rate (UR) is more for Indian women compared to men, we think due to the dynamics of intersectionality, UR affects the marginalised women the most.

Unemployment rate (UR) (number of persons unemployed per 1000 persons in the labour force) for urban+rural women of age 15 years and above according to usual status (adjusted) for different general educational levels for each social group, all-India.

Social group	Literate up to to primary	Middle	Secondary	Higher-Secondary	Diploma/ certificate	Graduate	Post graduate & above
ST	2	27	157	100	46	227	210
SC	51	17	55	117	187	206	171
OBC	6	31	58	85	190	160	158
Others	8	24	43	77	84	129	113

Source- NSS Report No.563: Employment and unemployment situation among social groups in India

The URs differ among women for different groups. The table shows UR is lowest for the Others group while it's highest amongst the marginal groups. In the middle level group- UR is highest for OBC women, at the secondary level- UR is highest for ST women, at the higher secondary level- UR is highest for SC women, at the diploma level- UR is highest for OBC women and for the graduate and post-graduate level, UR is highest for ST women. The only exception we see is for the literate upto primary level wherein, the UR is highest for the Others category.

Share Across Industry Groups

This section analyses the share of women employed (of different social groups) across the three industry groups.

Per 1000 distribution of (rural+urban) women workers across social groups by broad industry of work

Groups	**Primary**	**Secondary**	**Tertiary**
ST	**783**	145	72
SC	636	206	158
OBC	639	206	155
Others	501	**218**	**282**

Source- NSS Report No.563: Employment and unemployment situation among social groups in India

We see that the majority of ST,SC,OBC women are employed in occupations like agriculture,forestry and fishing(Primary). In the Secondary industry, which includes occupations like manufacturing, construction activities, civil engineering etc., the majority of "Others" women are employed. However, the SC and OBC aren't very far behind. The tertiary industry offers the most saddening results. The employment of ST women in this industry is nearly one-fourth of "Others" while the OBC and SC employment is nearly half of "Others".

Type of Work

The type of work you do has implicit revelations. It shows your social standing, level of dependence, control over finances, job security etc. This section analyses the type of work women across social groups do.

Per 1000 distribution of (rural+urban)women workers by statuses in employment

Social Group	Self- employment	Regular wage/salaried	Casual labour
ST	560	52	388
SC	424	118	**458**
OBC	590	111	299
Others	**636**	**213**	151

Source- NSS Report No.563: Employment and unemployment situation among social groups in India

Self-employment and a regular, salaried job is highest among "Others" women while casual labour is highest among SC women with ST women trailing behind. OBC women do nearly twice the casual labour than "Others" women while SC women do nearly thrice the casual labour of "Others" women.

Here are some of the reasons for the above economic analysis:

1. The marginal groups are often relegated to jobs like casual labour due to existing caste notions.
2. Poor levels of education and even low attendance rate means tertiary and secondary industry jobs and regular wage jobs remain outside acquisition of the marginal groups.
3. Poor access to financial schemes like micro-credit schemes- hindering a path towards self-employment.

Finance

While there are schemes to promote financial prosperity for low-income groups- the government recognises that Scheduled Caste groups might need special,specific schemes for their financial prosperity. The National Scheduled Caste Finance and

Development Corporation (NSFDC) was instituted to improve the flow of financial assistance for the SCs.

In this section, we analyse how men and women have fared under various schemes.

Men and women coverage of beneficiaries and disbursement for the financial year 2018-19.

	Number of Male Beneficiaries	Number of Female Beneficiaries	Amount given to Male Beneficiaries	Amount given to Female Beneficiaries
*Term Loan	**1369**	792	7868.10	4540.61
Micro Credit Finance	**5129**	4137	2235.50	1825.96
Mahila Samriddhi Yojana	0	**30694**	0.00	3273.60
Educational Loan Scheme	**121**	60	418.78	207.81
Laghu Vyavsay Yojana	**21036**	15621	27447.95	16826.17
Ajivika Micro Credit Yojana	0	**122**	0.00	59.29
Green Business Scheme	**1450**	900	1490.50	927.00

*Includes Mahila Kissan Yojana

Source- NSFDC

Except for one scheme, i.e. that Mahila Samriddhi Yojana which is a women-specific Micro-Finance scheme and the Ajeevika Yojana, all other schemes have more male beneficiaries than women. The Term Loan has nearly twice the male beneficiaries than women and this is despite the fact that the data includes the beneficiaries of the Mahila Kissan Yojana(a scheme meant for rural women in agri related activities only). The Education Loan scheme also has twice male beneficiaries than women.

Another corporation we looked into was the National Safai Karamchari Finance & Development Corporation. This corporation was instituted for the socio-economic upliftment of safai karamcharis, scavengers and their dependents. The corporation provides financial assistance through various loan based schemes and non-loan based schemes (e.g. Skill training).

Note: While the eligibility criteria to avail schemes under this corporation is not based on caste per say, it's a known fact that this line of work is caste-based discriminatory occupation which is why we think its apt to look into this corporation for intersectionality analysis.

Women make up 50% of safai karamcharis in India. However, they aren't 50% beneficiaries for various schemes.

The Scheme-wise details of beneficiaries/units for which funds were disbursed by the Corporation, financial year 2017-18

Scheme	Total Beneficiaries	Female Beneficiaries
General Term Loan*	6295	2110
Micro Credit Finance	6697	NA
Mahila Samridhi Yojana	7947	7947
Mahila Adhikarita Yojana	1234	1234
Education Loan	19	7
Swachhta Udyami Yojana	10	NA
Sanitary Mart	0	0

*Includes Green Business Scheme

Source- National Safai Karamcharis Finance and Development Corporation

For the General Term Loan scheme, women make up approx 34% of the total beneficiaries. Similarly, for the Education Loan scheme, women make up approx. 36% of the total beneficiaries. We were unable to find data to comment on other schemes.

It's commendable that the corporation has women-specific schemes, however, we noticed that the corporation falls short on achieving some of its targets for these women-specific schemes. For e.g., the corporation had a target of sanctioning 17.11 crores for the Mahila Adhikarita Yojana of which it was able to disburse only 9.42 crores in financial year 2017-18, thus achieving 55% of its target.

Observations

We made some observations after perusing the 2017-18 annual report of the National Safai Karamchari Commission and we think these observations can be applied broadly to understand why schemes don't effectively reach the target population and how it affects particularly women.

1. The Commission had received a total of 551 complaints out of which 89 and 204 were of harassment and service related complaints. The report stated some complaints were also of exploitation, nonpayment of minimum wages, atrocity and furthermore.
2. The Commission recommended that cumbersome loan procedures must be simplified and no security must be insisted. Insisting security from women is especially unfair as they don't own any security or their guarantee is under the ownership of their husbands. They also lack basic education to understand loan procedures.

3. The Commission noticed that even in families where the men have been liberated from this work, men still permit, rather coerce the women to continue this work to supplement family income. *"They are the most vulnerable section of the society as they face discrimination on the basis of caste and gender in all spheres of life and are subjected to gross violations of their physical integrity, including sexual abuse by dominant castes."*

Conclusion

We don't know if governments truly grasp the dynamics of double/triple oppression- however, some of their policies hint toward some understanding. Under the micro-credit schemes meant for marginalized, women do have interest rebates and there are women specific schemes available. Yet, it falls short and there are many reasons for this. They involve cultural, political changes and we are in no position to give solutions for such multidimensional problems. Furthermore, we have not included other extremely important intersectionalities such as the LGBTQIA+ and differently abled women due to certain constraints.

Returning to Dalit women, there is remarkable work being done by various organisations such as the All India Dalit Mahila Adhikari Manch, National Federation of Dalit Women and other grass root level organisations to bridge this multiple struggle gap. In conclusion, India has yet to reach the periphery of a developed nation. Unfortunately, India's road to development will only get longer unless we start concentrating on all of *its* people.

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Effect of Political Instability on Economic Growth

Naina Khurana and Haritha K.

Abstract

The purpose of this paper is to empirically determine the effects of political instability on economic growth. We look at how political instability affects the different variables affecting economic growth and we explore the question of whether political stability can sometimes hamper economic growth. Theories indicating a positive relationship between political instability and higher economic growth have been included to provide a fuller picture. We end with a case study of the current economic and political scenario of India and examine it through the lens of political stability.

Introduction- Politics and Policy

Before we dive into our study, it is essential to understand what we mean by the term politics. The study of politics in universities is called political science, political studies, or public administration. In everyday life, the term "politics" refers to the way that countries, states and areas are governed. In modern national states, people form political parties to represent their ideas. Over the years, specific, different political spectra have been proposed; for example, left-right, authoritarian-librarian, libertarianism or regulated capitalism; we will come back to these shortly.

As we talk about politics and economics, we need to first understand that politics is not an external entity that one can isolate himself/ herself from. The luxury of disengaging with political discussions comes with privilege and staying silent still contributes to an oppressive status quo. Being aware of and engaging with our country's politics is our democratic duty as citizens. Similarly, when we talk about economics, it is essential to note that economics too, is multi-disciplinary i.e. it involves several academic disciplines.

Now the crux of the matter is to cognise whether economics and politics are actually related, and if yes, then how? In theory, economics can be non-political. An ideal economist or say, an economicious, should ignore any political bias or prejudice to give neutral, impartial information and recommendations on how to improve the economic performance of a country. Elected politicians could then weigh up this economic information and decide how to go about things.

In practice, however, there is a strong correlation between economics and politics because the performance of the economy is one of the key political battlegrounds. Many economic issues are inherently political because they lend themselves to different opinions. Like firms and families, the government of a nation is an important economic actor whose actions can be understood by studying the preferences of the government leaders, and the constraints under which they operate.

What do we mean by political instability?

Political instability is defined as the potential for sudden and significant change in the leadership, policies, or condition of a country.

We can approach the concept of instability as the lack of political stability. Claude Ake in his book Comparative Politics, defines political stability as the regularity of the flow of political exchanges. The more the flow of these exchanges, the more politically stable a structure is. We can also define political stability on the degrees to which the members of the society restrict themselves to behavior that falls within the limits imposed by political role expectations. Any act that deviates from these limits is an instance of political instability.

Political instability can be defined in at least three ways. One approach is to define it as the propensity for regime or government change. Second would be the focus on the incidence of political upheaval or violence in the society, such as protests, assassinations and so on. The third is to focus on instability in policies rather than instability in regimes(i.e., the degree to which fundamental policies of certain rights are subject to frequent changes.)

But political instability has been part of every country's history at one point of time or the other. Many countries experience political instability even today and many are on the verge of experiencing it. So why is political instability a variable worth looking at?

Political instability is regarded by economists as a serious malaise harmful for economic performance. This is so because political instability is likely to shorten policymaker’s horizons leading to dissatisfactory or say poor short term macroeconomic policies. It may also lead to a more frequent waggle of policies, creating volatility and thus, negatively affecting macroeconomic performance. Considering its damaging impact on economic performance, the extent to which political instability is pandemic across countries and time is quite astounding.

How does political instability affect economic growth?

There is an excess of literature that suggests political instability adversely affects economic growth. From a sample of 113 countries for the period 1950-1982, Alesina (1991) finds that in countries and time periods with a high propensity of government collapses, growth is significantly lower than otherwise. More recently, Jong-a-Pin (2009) also finds that higher degrees of political instability lead to lower economic growth. Aisen and Veiga has calculated the reduction in economic growth, measured here by the annual real GDP per capita growth rate to be 2.39 percentage points as a result of an additional cabinet change which they have defined as a new premier being named and/or 50 percent of cabinet posts are occupied by new ministers. This reduction is mainly due to the negative effects of political instability on total factor productivity growth, which account for more than half of the effects on GDP growth. Political instability also affects growth through physical and human capital accumulation. There is an adverse relation between political instability and rise in investment and domestic production. Political instability also leads to a rise in inflation.

Why does political instability affect economic growth adversely?

An unstable political system leads to foreign investors not willing to take a risk by investing in such a system and look for more stable environments where there is a structure and permanency to economic policies and returns. When there is a sudden government change or overthrow, the current investors may choose to shift their resources to invest abroad, thus reducing their risk of facing unknown political and economic initiatives.

For local businesses, investing in equipment, research & development and human resources, including the recruitment of new permanent employees is achieved over the long run. Therefore, the institutions and policy forecasts have an impact on the management decisions of these investments. As policy uncertainties raise the expectations to invest and consume until it is resolved, the companies become more cautious and impede investment and consumption. Uncertainty about the different institutions, including the labor market, the environmental regulations and the electricity market, has similar effects on investment. This will affect the economic cycles over the short and long run economic growth

Political instability adversely affects productivity. By increasing uncertainty about the future, it may lead to less efficient resource allocation. Additionally, it may reduce research and development efforts by firms and governments, leading to slower technological progress. Violence, civil unrest, and strikes can also interfere with the normal operation of firms and markets, reduce hours worked, and even lead to the destruction of some installed productive capacity. Human capital accumulation may be affected by political instability because uncertainty of the future may induce people to invest less in education.

Grossman's (1991) analysis of revolution also states that in countries where rulers are relatively weak, the probability of revolution is higher and the citizens have higher incentives to engage in revolutionary activities rather than productive market activities. On the contrary, a strong ruler who makes a revolution unlikely succeeds in discouraging revolutionary activities in favor of market activities. There can also be cases of the current government, uncertain about its survival, sabotaging the economy before the next government comes into power.

Can political instability lead to economic growth?

Political stability has been long assumed to be a necessary component of factors that drive economic growth and it seems too logical of an assumption to be questioned. But there is research and empirical evidence that suggests otherwise.

One of the earliest arguments is the theory put forth by Mancur Olsen in his 'The Rise and Decline of Nations'; he argues that destabilizing elements such as change in governments and revolution distort economic activities in the short term but in the medium run, also sets the stage for more rapid growth. He also asserts that political instability, over the long term can be economically dysfunctional and cause growth to decelerate.

He provides the reasoning for the same as being the effects of self-seeking activity of interest groups or distributional coalitions, i.e., groups oriented towards struggle over the allocation of wealth and income, "who slowdown a society's capacity to adopt

new technologies and to reallocate resources in response to changing economic conditions, and thereby reduce the rate of economic growth".

Olson's Theory of Stability and Growth thus tells that a certain degree of instability is required for the disruption of these distributional coalitions which hamper economic growth. The discontinuous character of stability suggests a fourfold typology of political systems, as shown in Table 1. Each type is expected to have a characteristic growth pattern.

1) The Chronically Unstable states should exhibit persistently slow growth.
2) The Consistently Stable ones should grow relatively quickly but show a declining trend over time.
3) The Stabilizing political systems that are settling into a new pattern of political order should undergo a spurt in growth rate.
4) Finally, there are regimes that are becoming less stable. Olson does not make an explicit prediction about these destabilizing systems but the inference is that their growth rates would drop sharply.

The theory which claims universal applicability, would be more logical if restricted to democracies, where interest groups have a dominant influence. Even with this restriction, Goldsmith finds that this theory does not translate well when tested in the real world. The theory calls for all things other than the GDP to be held constant wherein stability increases the scope for distributional coalitions to engage in influencing economic decisions. But these other factors are never constant; moreover, factors affecting the pace of growth mentioned previously, such as a country's stock of human and physical capital, size of foreign trade, efficiency of economic and social institutions and so on have not been considered.

The 'politically stable' system enforces stringent barriers to personal freedoms. Similarly, other freedoms such as freedom of the press, freedom of religion, access to the internet, and political dissent are also truncated. This breeds abuse of power and corruption. Political stability in this case refers to the lack of real competition for the governing elite and not a system that provides the resources for economic growth.

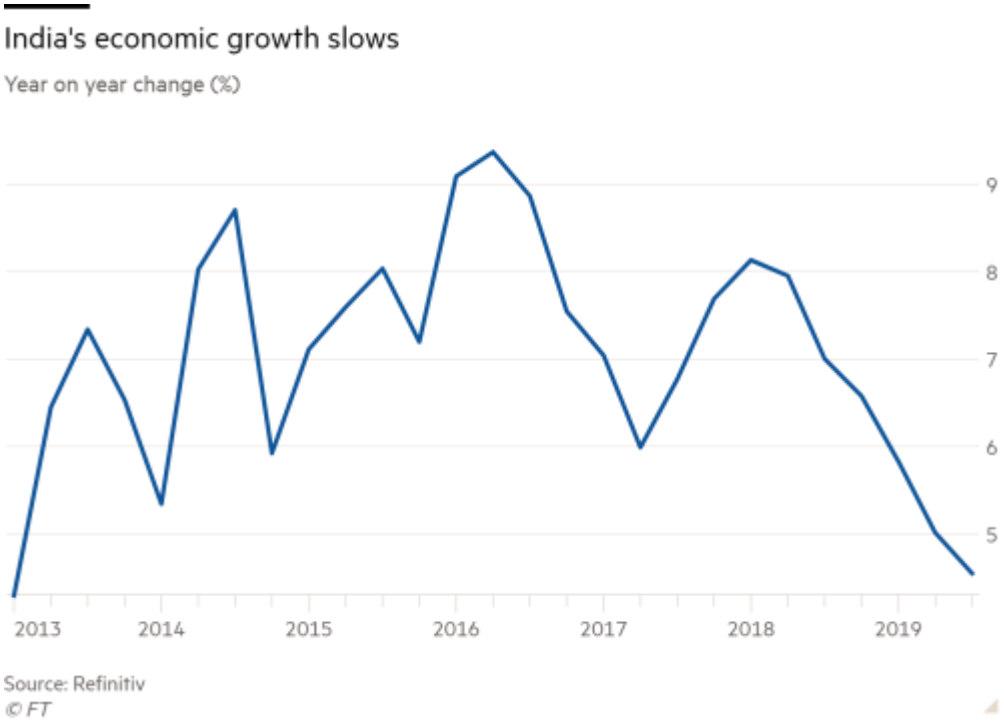
Another argument put forth is the need for change. Political stability can take the form of complacency and stagnation that does not allow competition. It can act as a breeding ground for crony capitalism and corruption. Political stability can also be achieved through oppression or through having an unelected government in power. A high propensity of a government change may be viewed favorably by economic agents if the current government is incompetent and/or corrupt and its possible successors are viewed as an improvement. Therefore, one can argue that stable governments do not necessarily lead to higher economic growth.

INDIA RIGHT NOW- A CASE STUDY

The situation of the Indian economy right now is puzzling and frustrating in equal measure. Puzzling because until recently India's economy had seemed in perfect health, growing according to the official numbers at around 7 percent, the fastest rate of any major economy in the world. Nor has the economy been hit by any of the

standard triggers of slowdowns. So, what has happened—why have things suddenly gone wrong?

Last year's election outcome not only reflected the return of optimism, but had also created what could possibly be a decade-long stability on the political front. For any economy, political stability and continuation of economic policies are highly crucial. We can say that the big ticket reforms established in the last five years hold huge potential to uplift Indian economy to its next level. However, there is no denying the fact that the Indian economy is seen growing by 5.0 percent in the 2019-20 fiscal year, the slowest pace since fiscal 2008-09 and significantly slower than a 6.8 percent expansion recorded in the same period last year, according to the First Advance Estimates, released by the federal Ministry of Statistics & Programme Implementation. The slowdown in economic growth has taken away from India the tag of world's fastest growing major economy to China. India's growth rates in the Q4 2018-19 and Q1 2019-20 were slower than that of China, which is a much bigger economy. Manufacturing is expected to advance by only 2 percent, sharply slowing from a 6.9 percent growth in the previous financial year, as trade tensions and global economic slowdown hit activity. The economy expanded 4.5 percent year-on-year in the three months to September, the weakest pace since the first three months of 2013, mainly due to a fall in factory output and exports and a slowdown in investment.



Amid everything, its true that the citizenship law is the leading cause for protests across the country, but research shows that economic distress and joblessness add to social unrest, especially among the youth. In this case study, we will try to understand what is actually happening with the Indian economy and see if political stability really guarantees economic growth.

A GRIM PICTURE

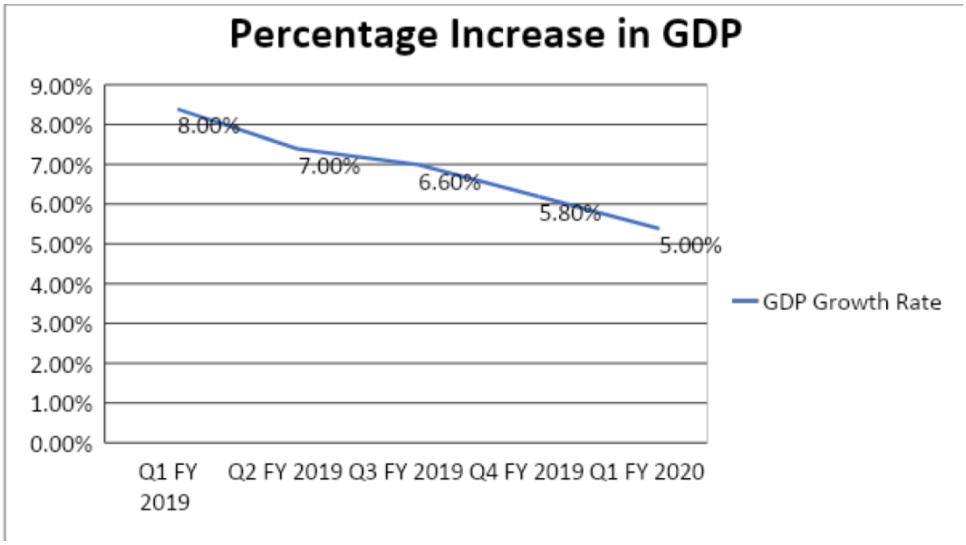
Economists are often split on what kind of a slowdown India is facing: Structural or cyclical. Cyclical refers to normal upswings and downs in business cycles. Structural slowdown is harder to correct because it's more deep rooted. Whatever it is, economists nearly agree that reviving demand by much higher government spending to boost consumption and investment is the only real option.

Let's begin by disseminating official data that has painted a grim picture over the past few months.

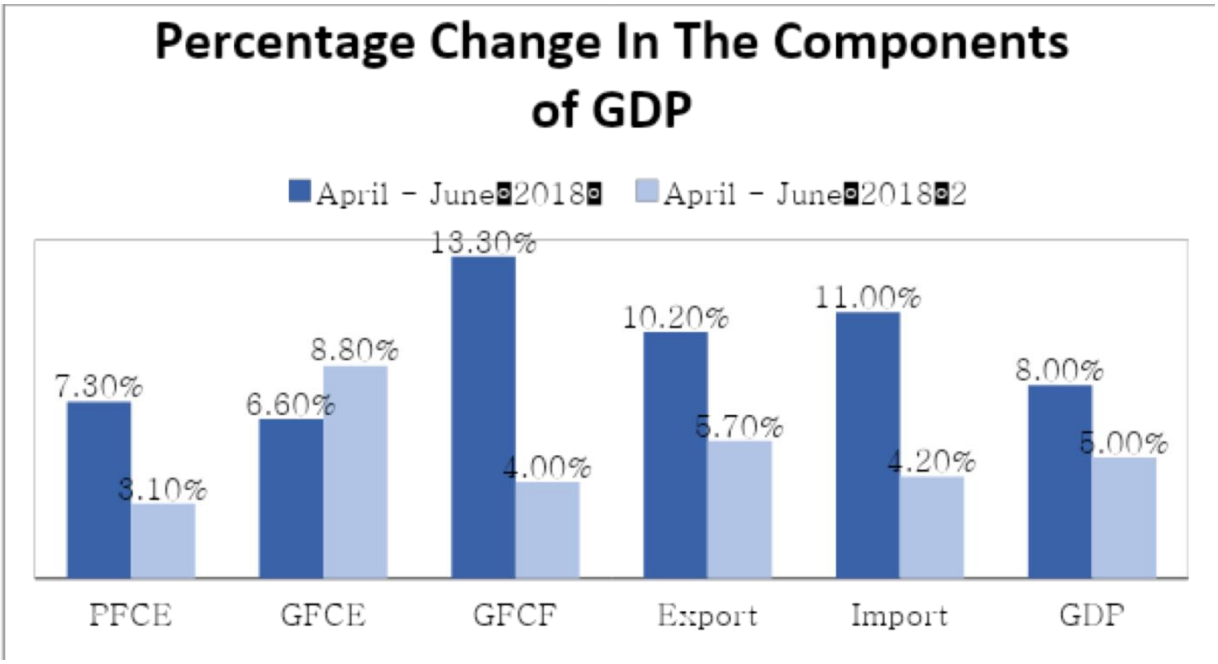
GDP:

The Gross Domestic Product (GDP) is the broadest quantitative measure of a nation's total economic activity. More specifically, GDP represents the monetary value of all goods and services produced within a nation's geographical borders over a specified period of time.

In real terms, the GDP growth rate for the first quarter is only 5%, the lowest it has grown since the fourth quarter of FY13.



The above figure shows the deceleration in GDP growth from 8% in the first quarter of FY19 to 5% in FY20. This expansion in GDP at a slower rate is termed as a growth recession as opposed to a recession in which economic growth turns negative. Economists define a recession as three consecutive quarters of contraction. A growth recession, such as this one, does not include the contraction of the economy. India is now in the third growth recession since 2008. What is crucial to understand here is that lower GDP means a proportionate decline in per capita income. Further, given high inequality in the economy, it is very likely that the poor will suffer more from the decline in the GDP growth rate than the rich. Correspondingly, the number of people below the poverty line could rise. A decline in the GDP growth rate could translate into a decline in the employment rate too.



As seen in the above figure, Private consumption expenditure (PFCE) dipped from 7.3% to 3.1%, this being the lowest growth in PFCE recorded since June 2012. Even investment (Gross Fixed Capital Formation), exports and imports have grown at a slower pace in quarter 1 of FY20 as compared to the first quarter of the previous year. It is only government expenditure (GFCE) that has grown at a higher rate. The growth in GFCE in the last 2 fiscal years have been the biggest since the financial crisis years of 2008-09 and 2009-10 and has been one of the driving forces of the economy to some extent.

Consumption:

Consumption accounts for 57% of India's GDP and therefore plays a key role in the slow down. Consumption fell to 3.1% from 10.6% in the March quarter, an 18-quarter low. From figure 2, we can see that PCFE itself fell from 7.3% in the March quarter to 3.1% in the June quarter, in spite of having had an accelerated growth rate of total consumption expenditure of 7.8% by the Indian households over the past 5 years. Any more fall in consumption expenditure, which seems all the more probable based on the fall in consumer confidence from 97.3% to 95.7% as measured by the Consumer Confidence Survey (CCS), will escalate this crisis further.

Investment:

Investment has been a major component of the economic growth of the country since the liberalization in 1991. Gross fixed capital formation (GFCF), the main constituent of investment in the economy, fell from 13.30% to 4.00%, as seen from Figure 2. This is mainly due to the fall in household savings, which is a major contributor towards investment. It has gone down from 35% in FY12 to 17.2% in FY18. The fall in investment causes the level of infrastructure to go down and causes doubt in the mind of small business owners and entrepreneurs regarding investing in research and development, thus stagnating technological development. Capital investments are important in the long run, generating profitability for many years by improving operational efficiency and boosting innovation.

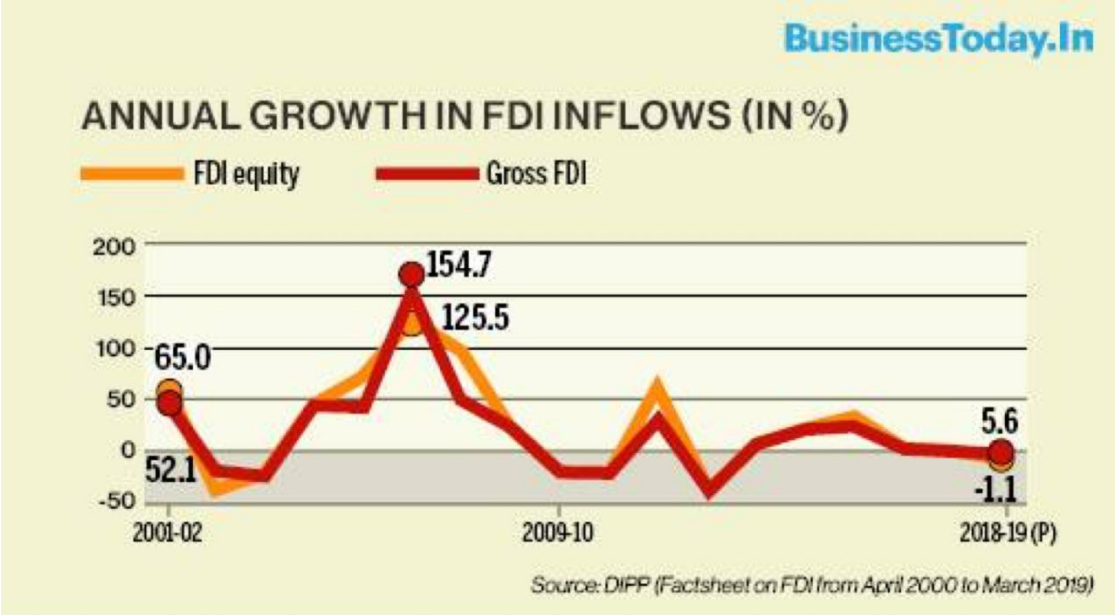
In the quarter ending in June, 2019, investment in new projects has gone down to a 15-year low, the Centre for Monitoring Indian Economy (CMIE) shows. Companies announced new plans worth Rs 43,400 crore in June 2019 almost 87 per cent lower than the last year same period. in recent months, investor confidence has started to fall. Business confidence of India Inc declined to its lowest in six years in August-October, according to the latest survey released by Delhi-based think tank National Council of Applied Economic Research (NCAER) on Monday. According to the quarterly survey, the Business Confidence Index (BCI) dipped to 103.1, falling 15.3% from the quarter ended July. The BCI survey asks four questions with equal weight to the answers such as the overall economic conditions will be better in the next six months, the financial position of firms will improve in the next six months, the present investment climate is positive and the present capacity utilisation is close to or above optimal. The fall in the BCI in October 2019 was driven by deterioration in sentiment across all four components, NCAER said. The steepest decline was for the component, "the overall economic conditions will improve in the next six months", where the share of positive responses fell to 46.3% in October from 58.9% in July. The percentage of respondents expecting "the financial position of firms will improve in the next six months" decreased to 39.3% in October 2019 from 48.8% in July. The muted business sentiment was further reinforced as 32.5% of the respondents in October believed that "the present investment climate is positive compared with six months ago", while the component of 'present capacity utilisation is close to or above optimal level' dropped by 86.2% to an all-time low since July 2009.

Foreign Direct Investment:

Apart from being a critical driver of economic growth, foreign direct investment (FDI) is a major source of non-debt financial resource for the economic development of India. Foreign companies invest in India to take advantage of relatively lower wages, special investment privileges such as tax exemptions, etc. For a country where foreign investments are being made, it also means achieving technical know-how and generating employment.

India was among the top 10 recipients of Foreign Direct Investment in 2019, attracting $49 billion in inflows, a 16 per cent increase from the previous year, driving the FDI growth in South Asia. Among sectors, telecommunications garnered the maximum FDI at $4.2 billion, followed by services sector ($2.8 billion). The services include financial, banking, insurance, non-financial/business, outsourcing, research and development, courier, technology testing and analysis.

The Global Investment Trend Monitor report compiled by United Nations Conference on Trade and Development (UNCTAD) states that the global foreign direct investment remained flat in 2019 at $1.39 trillion, a one per cent decline from a revised $1.41 trillion in 2018. This is against the backdrop of weaker macroeconomic performance and policy uncertainty for investors, including trade tensions, it said.



But on the other hand, India-bound FDI had dipped 1% to $44.4 billion in 2018-19 from $44.8 billion in the previous fiscal. This was the first decline in six years.

Also the 2019 budget announcement has led to a flurry of sales by Foreign Portfolio Investors due to the government's decision to implement taxation surcharge on the super-rich category. As of August 2, FPIs have been a net seller of over Rs 20,500 crore worth of stocks on the BSE, NSE and MSEI in the capital market segment, since July 1.

Overall unemployment has touched 8.2%, implying that people don't have(much) disposable income to spend. Hence the low demand. The low demand pulls down industries output leading to unemployment, which again reinforces low disposable income. Thus giving birth to a vicious cycle.

Banks have been facing liquidity shocks because of NPAs, NBFC crises, Bankruptcy and insolvency code. They are skeptical of lending for now. Indian banks are battling to clean up potentially Rs 8 lakh crore worth of sticky assets from their balance sheets, which in turn means loan expansion is muted. At a time when the government is driving structural reforms to accelerate economic growth, Indian companies look starved of long-term capital in an ecosystem that's skeptical about asset quality after a raft of defaults in the past few years.

MAJOR HIGHLIGHTS

Some of the domestic developments have clearly been negative, especially the **blunder of demonetisation, followed by the faulty implementation of GST**, which dragged growth down by still-unknown extents over still-to-be-defined periods.

Let's try to understand the mechanics behind this. India has a substantial informal economy that runs on cash. A large portion of this involves legitimate activities that are below the tax threshold and therefore should not be thought of as part of the "black" economy. Agriculture, for example, constitutes around 15 percent of GDP, runs mainly on cash, and is mostly tax-exempt. The farm economy was hit by the sudden withdrawal of cash from the system during demonetisation. The Centre for Monitoring Indian Economy reported that 1.5 million jobs were lost in the

unorganised sector during January-April 2017, just after demonetisation. This led to reverse migration to villages.

Even as the aftershocks of demonetisation were being felt, the government introduced Goods and Service tax (GST) in such a haste that it delivered another huge blow to the economy. Important reform, badly implemented. Many traders are still not sure about how to work with the new tax regime. Manufacturers want to buy supplies from firms that can provide them with GST receipts, which hampers the business of small traders unable to understand the complexities of working with GST. For example, sourcing from MSMEs took a hit as bigger companies preferred to purchase from suppliers who could provide GST receipts. In other cases, imports were preferred over sourcing from small Indian companies who barely qualified under the GST net. Entire supply chains were disrupted and we now know that Chinese imports have flooded our markets. There are also reports of increased harassment of taxpayers by overzealous tax authorities. The complex, multiple-slab GST framework, the constant chopping and changing of rules, along with the teething pain, have also hurt small and medium businesses.

Together with demonetisation, GST has caused substantial job losses, particularly to our most vulnerable workers.

Bad loans, NPAs, NBFC crises like IL&FS Crises dried the liquidity of the lending sector. The **merger of public sector banks** can help streamline and strengthen the banking sector. The question that remains is whether this was the right time.

The Modi government was slow to deal with the NPA crises, which have now afflicted the NBFC sector, too. This has resulted in banks being reluctant to lend and entrepreneurs being reluctant to borrow and invest. Now, bank frauds have risen too. While the Insolvency and Bankruptcy process is an important structural reform, in the current situation, it may not help the vast MSME sector. We need to understand that mergers are complex affairs. The lack of any strategic plan to assist our banks during their transition will further aggravate this problem. In the long term, the current selection of banks to be merged also carries a risk of regional concentration. It may take many years before any benefits of the mergers become visible.

The government is also relying on the assumption that merging weaker banks with stronger ones will ameliorate any deficiencies and create larger, stronger banks. It is equally possible that the weaker banks will drag the stronger ones down with them, as they have weaker balance-sheets. In fact, some of the anchor banks themselves are experiencing a weak credit profile.

Regardless, the immediate focus must be to ensure an increase in credit flows in the economy.

According to a recent working paper from the Center for International Development at Harvard University, titled "India's Great Slowdown: What Happened? What's the Way Out?", Arvind Subramanian and Josh Felman argue that the country's two major key drivers, **exports and investments have decelerated**, following the Global Financial Crisis (GFC). Export growth slowed sharply as world trade stagnated, while investment fell victim to a homegrown Balance Sheet crisis, which came in two waves. The first wave—the Twin Balance Sheet crisis, encompassing banks and

infrastructure companies—arrived when the infrastructure projects started during India's investment boom of the mid-2000s began to go sour. The economy continued to grow, despite temporary, adverse demonetization and GST shocks, propelled first by income gains from the large fall in international oil prices, then by government spending and a non-bank financial company (NBFC)-led credit boom. This credit boom financed unsustainable real estate inventory accumulation, inflating a bubble that finally burst in 2019.

It's well-known what happens to an economy when a bubble bursts. Consequently, consumption too has now sputtered, causing growth to collapse. As a result, India is now facing a Four Balance Sheet challenge —the original two sectors, plus NBFCs and real estate companies—and is trapped in an adverse interest-growth dynamic, in which risk aversion is leading to high-interest rates, depressing growth, and generating more risk aversion.

The government and RBI have been trying vigorously to bring the economy back to health. Every few weeks they announce new measures, some of them quite major. Most notably, the government has introduced a large corporate tax cut, perhaps the most sweeping corporate measure ever, in the hopes of reviving investment; and recently it announced a plan to privatize four major public sector undertakings (PSUs). Meanwhile, the RBI cut interest rates by a cumulative 135 basis points during 2019, more than any other central bank in the world over the period, in the hopes of reviving lending. But lending continues to decelerate, and investment remains mired in its slump. The monetary transmission mechanism has broken down. Even though the RBI is trying to pump money into the economy, lending is not growing because a business doesn't want to borrow so there is no demand for loans because the prospects look uncertain making investment stagnant.

At a time when financial indicators are ringing a loud alarm bell, the government's primary goal should be setting the basics right instead of going ahead with a "band-aid" patchwork.

For starters, it should first **acknowledge** that the country is facing an economic slowdown, address the issue in a transparent manner and consult economic experts, some of whom have been urging the government to focus on boosting investments, which could help in reviving consumer demand and increase the output of key sectors. The government needs project serious intent to handle the crisis and it must instil confidence in the people and send a message to the world. This requires a focussed approach from the Modi government.

Economists nearly agree that reviving demand by much higher government spending to boost consumption and investment is the only real option. In addition to giving industrial stimuli like the recent corporate tax rate cut, the government also needs to put more money directly into the hands of people through targeted transfers, which would have a textbook multiplier effect. Multiplier effect refers to a larger change in output (in this case, of goods due to demand) at every level of input or government spending. It needs to work on unshackling agricultural markets and tackle the lack of credit for capital creation. It is not only the public sector banks, but also the NBFCs that are choked. Key job-intensive sectors like textiles, auto, electronics and affordable housing must be revived and assured priority lending, especially for

MSMEs. We need to find ways to address export markets that have opened up as a result of the trade wars between the United States and China. There is a need for a credible roadmap for massive public infrastructure development, including through private investment. The government must remember to address both the cyclical and structural problems. If these are addressed, we can get back on the high growth trajectory within the next three to four years.

Conclusion

The main take away from this is that political instability will always be a hindrance to economic growth but the point that we also want to highlight is that political stability is not always conducive to economic growth, especially when the political stability is achieved through undemocratic means. We feel it is very important to understand that governance is not politics, no matter how tempting it may be to conflate them. From our case study, we conclude that even if a country has political stability, it is not necessary that it will be conducive for economic growth. However, what is important to note here is that the Modi government has such an overwhelming mandate-its a full majority two times in a row- it has a certain kind of power that governments before did not, in turn making it capable of a more impactful response. It completely depends on the government as to how it tackles its goal.

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Modeling Students' Participation in Politics: A Game of Strategies[1]

Aarti and Bharati J. Krishnan

Introduction

In theory, students' participation in politics paves through an ideal political mechanism in a specified region. In practice, however, students' politics is as tangled as any other civic mechanism. What makes it far more intricate is the implicit presence of various factors that affect the probability of a student's participation in politics. This article paper aims to discuss such factors and the implication of their presence in a societal system on the effectiveness of student politics in India.

Social Norms

In a dynamic game-theoretical model, as the concerned agents participate in a game in different time periods over a period of time, the setting in which the game is set evolves leading us to some social norms at the end. These social norms, in the end, tend to govern agents' behavior in the game setting. They act as a framework of sets of behavior that are expected from a member of a particular social group. These expectations are so embedded in the fabric of social setups that the agents often do not realize that it is the society that instills these behavior patterns within them.

India has had a vibrant history when it comes to students' participation in politics. The Nationalist Movement had first galvanized students into action during the Pre-Independence era. Hence, India was ahead of the rest of the world in terms of student participation in politics, her contemporaries only caught up during the 1960s. In India, social norms have a crucial role to play in determining. Thus it becomes crucially important to take social norms into account for our article paper.

According to H. Peyton Young in his 2014 paper on 'The Evolution of Social Norms', H. Peyton Young discusses three key features relating to social norms:

1. Norms are self-enforcing at the group level. People adhere to a norm because they expect others to do the same.
2. Norms evolve through organic interactions between members, rather than by deliberate design.
3. Norms differ from one social context to the next, and can even be contradictory.

When an individual enters a new social environment, which in this case is a university campus, different pre-existing and new factors have leverage on how she reacts to this new environment.

[1] We are indebted to Mr. Basab Ranjan Dahal, a third-year Mathematics student at Ramjas College and Mr. Ashish Singh, a third-year Political Science student at Ramjas for their time and assistance in the research study. Both the students are active participants in the political arena at Delhi University.

Variables and Justification

Now, if we consider an individual's degree of participation in politics to be the final equilibrium outcome, then there are various other crucial factors that go into their final decision regarding their respective participation in politics.

Such factors are as following:

1. **The original/initial state of their participation**

The original state can be referred to the state of various factors at the time when the model is set up, or the time when they are initially offered with choice to officially participate in students' politics.

(a) *Social/Cultural background*: The participation of the individual in politics greatly depends on personal experiences. If they belong to a minority group, many of the issues that are tossed around in politics may have had a direct impact on their lives. Hence, an individual's social background, whether they are a minority or not, might influence their inclination to participate. Directly facing these issues, as opposed to being a mere spectator, might impact the perspective people have on the need for political participation. It also might also create an overt need in them to change the current circumstances.

(b) *Political background*: Already having family members tied to politics might provide experience, connections and familiarity to political roles, procedures and the pros and cons related to politics. It might also imply prior biases, which might push individuals to join a particular political ideology. Individuals who don't come from a politically active background might not enjoy the same level of family support when it comes to politics.

(c) *Financial background*: Money and muscle power still reigns in India and in fact, most democracies. Having a strong financial base might not only ease the way for prospective participants but might also improve their chance to rise in ranks within their organization. Having monetary support also provides mental security to well-off candidates as opposed to not so well-off candidates. At the same time, having a sound financial background might prevent certain individuals from entering something as unstable as politics. Hence, a person's financial base can have a huge say in their political activities.

2. Parents' ideological beliefs

What discussion goes on a dinner table is likely to play a crucial role in affecting a human's perception about all sorts of issues that go around and are related to politics. Political leanings of a parent almost always comes into play while deciding their child's political ideological, at least in the kid's initial years, to a significant extent. A human mind is likely to get programmed according to the way many minds around him/her are programmed.

This process is likely to follow in case of determining one's perception around political ideology too. Also, the approval or disapproval of parents can be a salient variable while considering the willingness of students to participate in active politics.

3. Personal beliefs/convictions of students

The personal passions and ideologies of young inspired students, formed through their own individual experiences can also translate into a desire to support organizations that claim to represent those ideologies. Furthermore, this desire to support organizations representing their ideologies may be supported by the educational institute/setting they are a part of or may be not.

Setting Up of the Model

Know Your Variables

Variable	What is it?
P_d	Degree of Official Participation, varying from 0 to 1. It is a function of efforts put up by the student: f(e).
e	Efforts put in by the student to participate in students' politics. It has neither a lower bound nor an upper bound, unlike P_d. It is a function of Net Satisfaction (U_p) from participating in students' politics: g(U_p).
U_p	It is the net satisfaction that a student accrues from participating in politics. It is the difference between Gross Satisfaction and the Cost of Participation.
U_{psyc}	This is the entirely psychological utility that a student derives from participation. This has neither a lower bound nor an upper bound.
U_t	This is the utility from the more visible or tangible benefits that come along with participation in politics. This has neither a lower bound nor an upper bound. This does not have a lower bound because there is a possibility of a loss of property due to a student's affiliation to a particular subset of the larger set of students engaged in politics. This includes only the indirect loss (and not the direct loss) of property/cash/assets. However, this does include the direct benefits of cash/assets.
U_f	This is the utility derived from the concerned family's response/reaction to the agent's participation in the exercise. As expected, this variable too is neither bounded below nor bounded above.
C_f	This is the financial cost that a student of interest incurs in exchange for his participation in this exercise. This includes only the direct loss of cash/liquid or near-liquid assets. This is bounded below by 0 and not bounded above.
C_{nf}	This is the non-financial cost of participating in politics. This can be seen as the sum of time cost and psychological cost which comes along with participating in students' politics.

$\mathbf{P_d = f(e)}$; $0 \leq P_d \leq 1$ ……. (1)

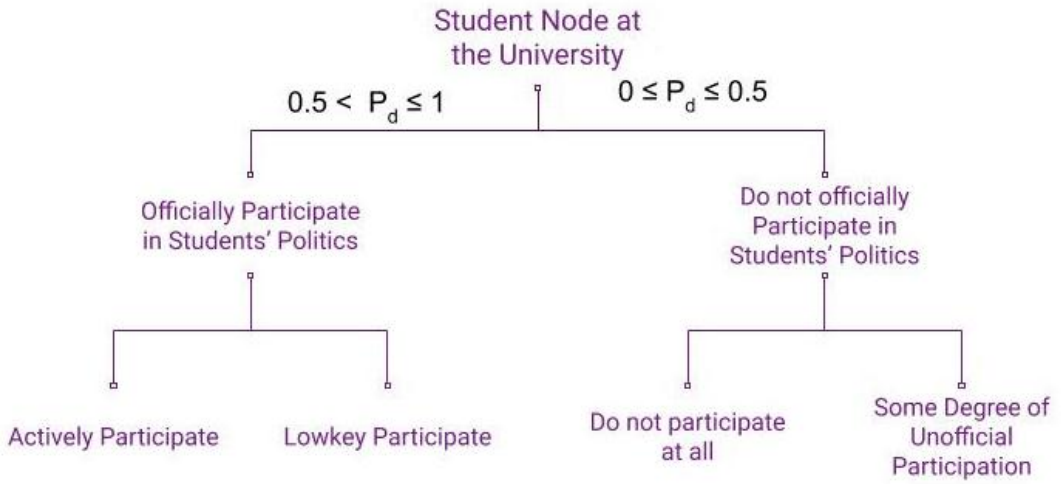
$\mathbf{e = g(U_p)}$

U_p = Gross Satisfaction - Cost

Gross Satisfaction = Psychological Satisfaction + Tangible Satisfaction + $Family_S$
$= U_{psyc} + U_t + U_f$

Cost = C = Financial Cost + Non-financial Cost = $C_f + C_{nf}$

Interpreting the Model



The main aim of the article paper was to understand the factors that determined the degree of political participation of university students. The factors were both internal (the personal convictions of students) and external (the political climate of their respective campus, their parents' beliefs, financial support, prior familiarity with politics, etc.).

The equilibrium state of participation was a result of these individual factors acting independently, as well as, in relation to the other factors.

In order to root the model in reality, two telephonic interviews were conducted with two politically active students from Delhi University. The takeaways from the interviews have been included along with the results from the model.

Key takeaways:

1. It was found that *given that* there is a strong correlation between a student's political participation and the tangible benefits that the student derives from active involvement in politics, a student with some sort of a political back-up, be it through his family or friends, is much more likely to participate in students' politics. On the other hand, if a student is deprived of political backing, either through family or friends, then, by symmetry, there is a very strong likelihood that they may not participate in politics. This finding/inference was reinforced by the interviews, where both the interviewees had political backing from either their

family or the friend circle, or both. Additionally, one of the interviewees made it a point to tell us that while individuals who were both financially strong and came from a politically active background were highly likely to engage in politics, individuals who were financially well off without a politically active background, overtly avoided political participation. Hence, a prior or current political support from either the family or social group has a dominant role in determining the political participation of a student.

2. If a college/university is currently very politically active. It leads to a higher rate of conversion (of efforts) into tangible or non-tangible benefits. Hence, if we put an evolutionary game theory model into place, the steady state Nash equilibrium is extremely likely to be the majority of students (at the institution) participation in politics.
3. The psychological satisfaction that students derived from political participation is a crucial incentive in both the entry and sustained commitment of students in politics. One of the interviewees found that the moral stimulus of "bringing about some change" in society was a crucial motivator for the entry of some students into the political realm. The other interviewee found that social media attention, as well as the connections that you made while engaging in political activity was another major impetus for political participation.

We can say that if we are to take a weighted average of the expected value of the three different utilities, U_{psyc} might be placed with a larger weight than the other two, U_t + U_f, especially in determining the entry of an agent/student.

Conclusion

Student participation in politics has always been a crucial indicator of the society's values, ideals and potential. Through this article paper, our primary aim was to establish a nexus between various independent factors that might add up to either increasing or reducing the likelihood of political participation by a student. The resultant degree of a student's participation in politics was found out to be a result of the interlinked interaction of various factors. While the addition or even absence of these factors does not guarantee a final result, their existence majorly impacts the final result.

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The Political Economy of the Free Market

Sakshi Dhawan and Kritika Chakrabarti

Abstract

This article focuses on the role that political economy (i.e., governments) play in setting the rules of the free market with regards to property, monopoly, contracts, bankruptcy and enforcement, and how these rules can be framed to favour certain groups over others, leading to the widespread inequality that we see in today's world. This article will examine what the term "free market" means, the justification for this form of organisation, and whether it is implicitly rigged or rigged due to specific government and legislative structures.

An Introduction to the 'Free Market'

A market refers to an institution where individuals or agents come together to voluntarily exchange goods and services, the value of which is usually measured in terms of a common denominator - money, the medium of exchange. However, markets, throughout history, have never been viewed as purely economic institutions (though the establishment of economics itself as a discipline it it's own right post-dates the creation of a marketplace), they have always carried moral connotations as well - negative associations with the sins of "greed" and "gluttony" and an opposition to the existing establishment, but also positive associations with individualistic liberty.

The justifications and criticisms of markets tend to be steeped not only in economics, but philosophy as well. Sen (1985) bifurcates the justification for free markets into a justification based on rights and liberties or the consequences of the same. The rights in question are concerned with entering into voluntary exchange transactions with individuals or agents, based on the right to private property. Such a justification for markets based on rights is often used in tandem with the idea that the right to private property predates the establishment of the state, so any interference with this right by the state is perceived to be an overreach. A consequential justification for markets is based on the outcomes that it leads to - it encourages sociability and rational interests as opposed to "violent passions" (Stanford Encyclopedia of Philosophy, Markets). According to Zupan (2011), free markets also promote trust and integrity through the possibility of multiple exchanges - "the more the future matters, the better behaved individuals are in the present." Labour markets are also said to recompense individuals based on their efforts to make society better off as a whole, an argument that is based on notions of personal responsibility. The most important argument in favour of markets is one that also provides the most basic justification of a free market system.

A market is said to be free when it is based on voluntary exchange between different parties, with minimal intervention from the government. They have decentralised structures and the absence of coerced or conditional transactions. A pure free market economy, one without any form of governmental intervention is hard to find, however there are several economies that are close to this definition of a free market. While the

relationship between the state and the market under a free market system appears to be negatively correlated, this view is not fully accurate. In the words of Dean Acheson, "the problem with a free market economy is that it requires so many policemen to work". The state is required to lay down the rules of the free market, and secure many of the preconditions for a free market - for example, the state must enforce contracts for the functioning of a free market system, and also respond in cases of market failure. The state, therefore, cannot purely be characterised as an "intruder" in a free market system.

Proponents of free markets tend to use lines of argumentation that prioritise the concepts of freedom and liberty above all else when opposing government intervention. This, however, requires a deeper examination of 'freedom'. The freedom that an individual is allowed in a free market system is the freedom to act independent of coercion. This is what is known in philosophy as negative freedom. Positive freedom, on the other hand requires not only the absence of coercion or force, but also the ability to exercise autonomy or self determination. Is this a metric that one can see fulfilled in a free market system? In a free market system, the autonomy that an individual can exercise often becomes a function of the market as well. One's ability to take control of one's life is a function of the level of educational attainment, access to healthcare, state infrastructure etc. Such a criticism of the free market is not new. In "State Intervention versus Free Market", Ghosh (1992) writes:

"Effective demand in economics is demand backed by purchasing power…. So if effective demand has to be backed by purchasing power; and purchasing power comes from the ownership of assets and resources. The distribution of the current social product also depends on control over the resources which generate the social product. You have the genesis of 'market demand' therein, by way of control over the distribution of the social product, through control over the resources that lead to the generation of the social product. The 'market friendly' approach is therefore nothing more, and nothing less, than an approach that favouring the extant distribution of income and wealth, the extant control over the resources of a community."

Favouring the existing distribution of wealth and resources is reflected in economic theories as well. The Pareto efficiency criterion defines an allocation of goods as 'optimal' if there is no way to redistribute or reallocate goods to make at least one individual better off without making one or more individuals worse off. This is favourable for groups and individuals who are already better off, because it makes a change to status quo, by reallocating goods and resources, inefficient in nature. Regardless, the justification for wealth that individuals have earned through exchanges in the market is a part of one of the most powerful arguments for the free market.

Under a free market system, all exchanges that take place are voluntary in nature, and at the end of a voluntary exchange, each party is better off than it was at the start of it. If they did not believe that they would be, then they would not enter the exchange in the first place. This argument also accounts for the subjective judgement of an individual. It allows an individual to ascertain for themselves what would increase their welfare, and enter into a transaction based on this belief. As both parties perceive themselves to be better off after the trade, each transaction increases the level of

welfare in society. Therefore, an individual who has participated in multiple transactions has made those many people better off, and this is the foundation of their claim to their wealth.

Free Market Rules

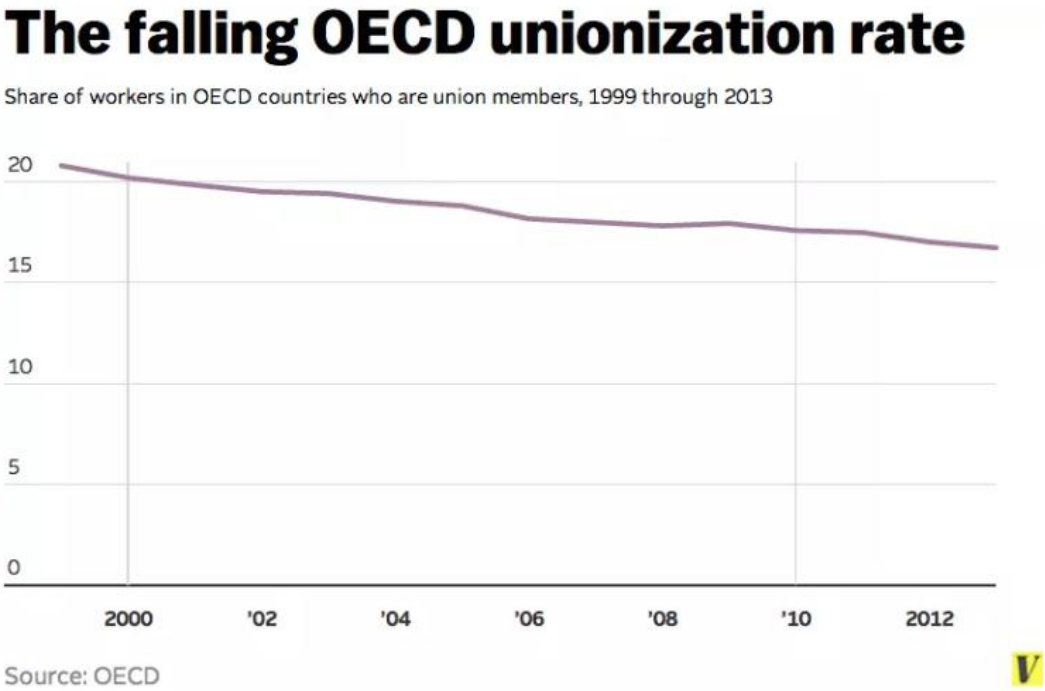
Free Markets and Wage Setting

A trade union is an organisation that has been formed by workers from related fields that works to advance the interests of its members. Trade Unions are usually formed to work towards improvements in pay, working conditions, and benefits through collective bargaining. They also influence the terms of employment for non union members through spillover effects in the market. Collective bargaining is an extremely important feature of unions because of the inequality of bargaining power that exists in the labour market. Bargaining power is said to be unequal when one party has more and better options than the other party and is therefore in a better position to negotiate. The recognition of unequal bargaining power within the labour market is not one that is novel. In the *Wealth of Nations*, Adam Smith writes,

> *"The masters, being fewer in number, can combine much more easily; and the law, besides, authorizes, or at least does not prohibit their combinations, while it prohibits those of the workmen. We have no acts of parliament against combining to lower the price of work; but many against combining to raise it. In all such disputes the masters can hold out much longer. A landlord, a farmer, a master manufacturer, a merchant, though they did not employ a single workman, could generally live a year or two upon the stocks which they have already acquired. Many workmen could not subsist a week, few could subsist a month, and scarce any a year without employment. In the long run the workman may be as necessary to his master as his master is to him; but the necessity is not so immediate."*

While it is true that unionising is no longer illegal in most of the world, "union density" (the percentage of the total number of workers in a given location who are trade union members) varies significantly across countries: from 90.4% in Iceland to 1% in Myanmar. As inequality has risen, unionisation worldwide has fallen. According to Western and Rosenfeld (2011), the fall in unionisation accounts for a fifth of the growth in men's earnings inequality, and if the normative impact of unionisation on non-unionised wages (there is a positive correlation between the two) is considered, then the decline of unionisation accounts for a fifth to a third of the growth in wage inequality.

Now, it is intuitive to view unions as possible monopolists, restricting wages in the free market. Under such a conception of a trade union, it violates the rules of the free market. However, it is possible to view labour unions as a free market solution to a problem that arises from within the free market. A labour union can be viewed as a "employee-owned businesses that sells labor".


The falling OECD unionization rate
Share of workers in OECD countries who are union members, 1999 through 2013
20
15
10
5
0
2000
'02
'04
'06
'08
'10
2012
Source: OECD


The State Of Global Trade Union Membership
Trade union membership as a percentage of total employees*
Iceland 90.4
Sweden 66.1
Belgium 54.2
Italy 34.3
Canada 25.9
Ireland 24.2
United Kingdom 23.2
Japan 17.1
Germany 16.7
Australia 13.7
Mexico 12.0
South Korea 10.5
United States 10.1
Turkey 8.6
France 7.9
* Selected OECD countries (2018 or latest year)
@StatistaCharts
Source: OECD
statista

Competition in free markets

Competition is an essential component of markets, and results from scarcity. There is never enough to satisfy all conceivable human wants and a free market with the tools of demand and supply determines who gets what. In offering goods for exchange, buyers competitively bid to purchase specific quantities of specific goods which are available, or might be available if sellers were to choose to offer such goods. Similarly, sellers bid against other sellers in offering goods on the market, competing for the attention and exchange resources of buyers. Since, there are ideally no external influences in a free market, it efficiently sets the economic equilibrium through competition.

In a competitive free market, entry and exit of firms are unrestricted which grants the market its highly competitive in nature. With increase in competition in a market, the price elasticity of supply increases i.e. with a small change in price, the quantity supplied in the market alters drastically. On the other hand, in a monopoly where a firm is the sole producer of the good and has no competition, it can set a price according to its own will (although it is a given fact that a rational producer will always choose the price and quantity at which it is able to maximize its profits). In a free market, such kind of power can be harmful for the economy and that is exactly where governments may play their role (for example, by providing subsidies to the producer to cover the loss it would incur to produce a quantity with is more than the equilibrium quantity) but a free market arrangement does not allow such interference thus often leading to shrinking of the market size. Different tests can be applied in order to identify a market under a monopolist. It is possible to view the existence of a high market share to be the same as having a high degree of market power, but the traditional test that government authorities use to test for monopolies is known as the SSNIP test - it is concerned with testing the impact of a hypothetical Small but Significant Non-transitory Increase in Price on the profitability of the firm. If there is demand side substitutability (when customers can switch demand to 'substitute products') or supply side substitutability (when firms operating close to the market in question can supply similar products to customers at lower prices), then such an increase will lead to a significant drop in the sales of the firm and profits will fall (Griffith and Geroski, 2003)

In cases where a monopoly market is identified, laws such as antitrust laws may be enforced, making the market healthier by restraining price-fixing conspiracies, corporate mergers that are likely to cut back the competitive fervor of certain markets, and predatory acts designed to gain or hold on to monopoly power.

Free trade

Free trade is a free market idea applied to international trade : a trade policy that does not restrict imports or exports, thereby allowing for voluntary, cross-border exchanges. Free trade was best exemplified by the unilateral stance of Great Britain, who reduced regulations and duties on imports and exports from the mid nineteenth century to the 1920s. Today, most nations are under are members of the World Trade Organization, and there exist multilateral agreements which allow free trade among them.

But before we get into the merits and demerits of free trade, we must first understand what it actually means ; the trade of goods and services without taxes (including tariffs) or other trade barriers (e.g. quotas on imports or subsidies for producers), the absence of "trade-distorting" policies (such as taxes, subsidies, regulations, or laws) that give some firms, households, or factors of production an advantage over others, unregulated access to markets and market information, and the inability of firms to distort markets through government-imposed monopoly or oligopoly power.

David Ricardo's theory of international trade suggests that trade between countries is always beneficial as long as they have comparative advantage (or lower opportunity cost) in the production of at least one good. If both countries produce the good in which they have comparative advantage and exchange it for the other one, they both gain. However, the degree and the nature of these gains changes - as nations internalise, they gain less and less through globalisation. Within countries too, they find, the gains from globalisation are concentrated at the top of income brackets, resulting in higher inequalities.

However, if the government interferes and distorts this free market arrangement, then what happens? Suppose if a tariff is imposed which raises the price, the producer surplus increases while the consumer surplus decreases. Along with it, the total surplus falls, as the society faces a deadweight loss. Then why do governments opt for taxation despite its ill effects that shrink the market size? The answer is protectionism and generation of public revenue. This, nonetheless, is only one side of the argument. While it is true that globalised economies tend to have more unequal market outcomes, the net outcome (post the redistribution of resources by the government in the form of taxes and transfers) appears to be positive (Lang and Tavares, 2018).

Now, where does this analysis leave the free market and the state? Scott (2011) proposes that as long as the free market is solely focused on the maximisation of individual incomes, and not the maximisation of societal benefits on the whole, it does not guarantee or approximate a socially optimal outcome. Ricardo's theory of trade also suggests that globalisation will impart both gainers and losers - along with the idea that the benefits from globalisation must also be used to recompense those who have been harmed by it.

Conclusion

Like all attractive systems of operation, the free market too suffers from limitations such as income inequality and market failure. Income inequality is a pressing issue in most countries of the world that are open to the adoption of free markets, or more specifically, free trade which encourages exports of high-quality and often inexpensive goods and services, thereby promoting employment among highly skilled individuals, or those who can offer their labour inexpensively. These increased imports of goods made possible by free trade, however, concern products that require more low-skilled labor. As a result, free trade causes upward pressure on wages of highly educated people and downward pressure on those of low-skilled people, which also increases income inequality.

Market failure is a situation defined by an inefficient distribution of goods and services - leading to net social welfare loss - in the free market, in which the individual incentives for rational behavior do not lead to rational outcomes for the group. Such a situation forces the government to interfere and tackle externalities which occur when one person's actions affect another person's well-being, without the relevant costs and benefits being reflected in market prices. The state also provides public goods, ensuring that consumption of a good by one person does not reduce the amount available for others to consume and the benefits a person derives from a public good do not depend on how much that person contributes toward providing it. In such a situation, everyone benefits, but perhaps in differing amounts.

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DR. ARUNAVA SEN

PROFESSOR, ISI DELHI | GAME THEORIST | INFOSYS PRIZE WINNER (2012)

Q.1 What are your current research interests and what drew you to that particular area?

My research interests are in economic theory. Economic theory is generally some sort of formal analysis and by formal analysis, I mean analysis within the scope of some model where different agents interact.

If you study mathematics, you'll study Pythagoras theorem which is so many thousand years old. But everything you read about Economics is very recent. A lot of time was spent in the 30s and 40s by economists like Marshall and Samuelson, developing this competitive model in which the agents took their environment as given and looked at the implications of that. But the other great development which took place in the history of not just Economics but generally in the history of ideas was this incredible book by Neumann and Morgenstern called **the Theory of Games and Economic Behaviour in 1944**. It laid down a basic model to allow for the analysis of this kind of multi-agent interaction. This could be chess, this could be tennis, this could be an oligopoly, etc.

They wrote something like that which obviously was of great interest to economists and this work was then refined by economists like **John Nash** and **Lloyd Shapley**. But it was only in the 1980s that the formal analysis of game theory reached the discipline of economics as it were. And it brought profound changes to the study of economics. If you went to the graduate study of Economics in 1965 or 1975, it would be completely different from what you would see in 1985 and 1995. People started studying these enormous, new, powerful tools of game theory.

When I went to graduate school, it was in the 1980s when all of these developments were just taking place, there were lots of people who were very excited by these things. There were a couple of people who were at the Delhi School of Economics who were a couple of years ahead of me, who were also graduates and they were all very excited. So when I went there, they said that I must learn this amazing new stuff, on this huge range of issues. So that's how I got into it.

The first kind of problem that I got interested in, on which I wrote my thesis on, is called "Implementation". It sounds bizarre, but it won a guy a Nobel prize. The best example of that is the biblical story of King Solomon. So King Solomon is a figure in the Old Testament, a king who is known for his wisdom and his judgment, Solomonic judgment. So what's the famous story about Solomon? There are two women who come to him, both claiming to be the mother of a child. So the question is that Solomon has to make a decision about who the child belongs to. So Solomon tells to cut the child in half whereupon the true mother concedes. Then Solomon says, “I know who the real mother is now, give the baby to her.” So this is a classic problem of what is called **Implementation Theory**. Imagine that there are **two states** of the world as it were. One in which the **woman 1** is the real mother, and the other in which **woman 2** is the true mother and there are three options before Solomon - give the child to woman one, let's call it **option A**; **option B** is giving it to women two; **option C** is to cut the child in half. So formally, the question is, what does Solomon want to do?

He has this objective function which says that in each state, give it to the right mother. So in state one give it to woman one, in-state two give it to woman two, so that's his

objective function. But what's the difficulty? The difficulty is that he doesn't know which state it is, but the two women know what state it is, they know who the true mother is and who the imposter is, but Solomon doesn't know. So is there a way for him to get these women to make certain announcements, do certain things, such that when you look at the equilibrium of the game, called the **Nash equilibrium** of the game, then **that does exactly what his objective function is**.

Solomon played a trick, which unfortunately game theorists are not allowed to play. What he did is like the income tax authorities saying that okay, I know that some of you have undeclared incomes, if you announce your real income, I'll give you a big bonus. Then, you announce your real income but then they say oh no, now we've changed the game, so now I'm going to take away your income and send you to jail for fifty years. So I've changed the rules of the game. You thought the rules were of a certain way and then I changed it. So Solomon said he was going to cut the baby, but he didn't do it, he changed the *rules*. So formally, we can show that we cannot do what Solomon did, that the Solomonic thing is actually impossible.

So part of the stuff I wrote in my thesis was, what if you could flip coins and do certain things, so on so forth. So anyway, those were the kinds of things, issues that I got involved in. Even now, the sorts of things that I'm interested in is about voting models. One of my main areas of interest is called Strategic Voting where agents have private information about their ranking and they realize that they can manipulate it, and use it to their advantage. The question is what can you achieve under such circumstances.

I also have some interest in certain things like auctions. In auctions, you pay for things but again your valuation is private information. If I have to sell an object, I want to make the most money from it. And again, what's the best way for me to sell the object in order to maximize my expected revenue is a **classic question in mechanism design**. These are some of the areas I am interested in.

Q.2 Sir, the Condorcet Jury's theorem assumes to rule out insincere voter behavior. But in practice, insincere voting does take place. Are there insights from game theory that you think can be used to model or influence voter behavior in such situations?

Condorcet had two basic contributions, one of them was the jury's theorem. There is something else that Condorcet did which is very important if we follow the arguments of Brexit, for example. So let me explain the second contribution first. Condorcet paradox is that the majority of voting can lead to cycles. So suppose I have three proposals, **A, B, and C**. And suppose there are three agents **1, 2 and 3**. So agent 1 likes A to B to C, agent 2 likes C to A to B, and agent 3 likes B to C to A. Now let's do majority voting. Now over A-B, two guys to one would like A to B, two guys to one would like B to C and two guys to one would like C to A. So you have what's called a cycle. So every proposal that you can think of is beaten by some majority, and that's what happened in Brexit. Whatever proposal people put, a majority defeated it.

The Condorcet jury theorem is about a different model of preferences. So the model of preferences in a jury model is that, imagine there's a person that is brought for trial.

The jury is trying to make a decision as to whether they should acquit or punish the guy. Now all the agents have the same preferences, which is either to acquit if the guy is innocent or to punish if the guy is guilty. Everybody wants the same thing, they're not biased or vindictive people. The thing is that everybody receives a private signal about whether the guy is guilty or not, it's just your reading of the guy. If I'm the guy at the dock, maybe when I'm asked certain questions, I start twitching or something, and you notice it and say that I've got a signal that this guy is guilty or that he's innocent.

Now the question is, Condorcet said, how can we ensure that the right thing happens? Each of us has to vote to convict guilty or not guilty, and how are we going to aggregate these verdicts? Condorcet said that the best way to aggregate these is by the majority voting rule. Let everyone say guilty or not guilty, and count the number of these votes and then whichever is more, we'll go with that. Why is that, it's because of what's called the '**Wisdom of the Crowd**'. Everybody is getting some partial information and the best way to aggregate that information is to use everybody's information because everybody is observing something. So he assumes sincere behavior.

There are complications where, for strategic reasons, you may ignore the signal that you've got. I'll give you an example of why that might happen. But generally, if you're sincere, then he's just trying to justify the wisdom of the crowd. You might say that that's a powerful argument for why democracy is good and why authoritarianism is bad. Authoritarianism is where decisions are made by one or a small group of people. What happens is that you cannot observe, you ignore the signals that everybody else has received about whether something is good or bad. So if there's a policy, whether it's good or bad depends on the signals that everybody receives. But in authoritarianism, because of the way it is, it centralizes this, and you just don't ask other people. Not taking their opinion into account makes it more likely that you'll be wrong, so you get it wrong. So it's better to ask everybody and it's more likely that you'll get it right. That's Condorcet.

But you're right, there are problems with insincere behavior, why is that? The problem is that, imagine, for example, what's the jury rule, for instance in the U.S., that there are twelve guys and to convict, everybody has to say, convict, it has to be unanimous. Now I have received a signal that the guy is guilty, and I'm thinking what should I say-- suppose you get the signal that the guy is innocent, when is it that my vote is going to matter? If the eleven other guys say that the guy is guilty and I say that no he's not guilty. What is the probability that eleven guys have received one signal and that I have received the opposite signal? You can see that it's completely sensible to think that I've been mistaken that I've got the wrong signal, that the guy is actually innocent. So what will you do? You'll ignore your signal and vote guilty because your vote matters only in the case that everybody else says guilty and you're saying not guilty and the probability that you've received a correct signal in that eventuality, or the condition of that event, is very low. You're more likely to assume that you've got it wrong, that you've just received a bad signal, so you say let me just ignore it, and let's just go for guilty. So everybody does it and the guy gets convicted. This is the strategic problem that Condorcet assumed away.

There's a big literature around all this. So if you get into research, you can get into the depth of it, reading thirty papers of exploring various aspects of just this question, you know, should I be truthful, etc.

Q.3 Sir, how has been your experience, teaching for more than three years?

Teaching and research are different things although they're connected. So teaching is, you understand something only when you teach it. When you try to explain something to somebody, you'll have to confront any gaps in your argument, which otherwise you might not be aware of. So it's fabulous. I can't recommend it highly enough. It's nice to be always, to deal with people, with young people with fresh ideas. Research is always fantastic, you know, enormous freedom to travel, to collaborate with people from all parts of the world. I've written papers with people from every part of the world. So it's all a fabulous experience, you'll find it hard to replicate it in any other area of life. It's the least bureaucratic set up that you'll ever be in. In my almost how many years, nobody has told me that you have to do this, you have to do that, except for minor responsibilities. So I think it could be very exciting.

Q.4 Sir, how common is it for the government to have game theorists for designing a policy?

I would say that India is not a country where expert opinion is valued very highly in general. It's a country where we have a long tradition of people from the civil services and so on making decisions on a riot field and deciding how to price tea, they're known to do everything. That's our tradition. And I do think that, compared to other advanced or industrialized countries, India falls behind. But, on the other hand, India is a very poor country. In relation to other countries with India's per capita income, India may well do better.

So I suppose the government can and should use more expert opinion, but in many cases, people are very wary of experts because they think that experts are biased, they're just very suspicious. So just to be a guy on the street is supposed to be good enough.

Q.5 In your work, "Fair and Lovely", you discuss a large literature on the problem of dividing resources when agents differ in their preferences over these resources. Of the models discussed, which one do you think can be most instrumental in dividing the task of pollution cleanup among countries?

There is a whole literature on what's called "fairness". It's a fascinating area. I can give you several examples, from antiquity, of what are the principles of fairness, etc. There's nothing special about the pollution problem. I mean if you ask me, what's special about the pollution problem perhaps is, you know on a range of issues, relating to what's verifiable, observable, etc. But what's interesting about fairness is how rich the problem is.

Here's a fairness problem, this is a problem of what's called **bankruptcy**. You die and you have creditors. What you owed dying is more than your estate. Again, this is a

problem of antiquity. This comes from one of the oldest problems in, I think this is from the ancient Greeks, what's called the problem of the contested garment. So there are two people, there is one garment and one guy claims all of it, and the other person claims half of it. So what's the right way to divide it, so here are two solutions. One is the Aristotelian solution, Aristotle believed in proportions. He said that by demand, the guy who wants the whole thing, his demand is twice that of the other guy, so you must do it in terms of 2/3rds to 1/3rd. So one guy gets 66.6% and the other guy gets 33.3%. But the other solution or there are many solutions which are equally, again this is a solution which is from antiquity. One guy has given up half, he wants only half. So what is contested is half. So you split that equally. It should be 3/4th to 1/4th. And there are beautiful solutions, you know so what's a bankruptcy problem. The bankruptcy problem consists of n+1 numbers. What are the n numbers? The amount that each creditor wants and the last number is the estate. So the sum of these numbers has to be greater than the estate. Given this, a solution tells you how you split the estate. And again, there are these fabulous solutions which tell you how you do that.

Here's an application. Suppose there are a number of people below a well-known poverty line of a hundred rupees per day. And there a whole bunch of people who are below the poverty line and you have a total amount of money to distribute to these people, but there isn't enough money to bring everyone above the poverty line. And the other thing is, you don't want to give anybody more than the poverty line. How should you distribute it? So the bankruptcy problem will give you different ways to do it. If you're a bureaucrat, then one of the things that you might be very tempted to do is to look at the guys who are just a little bit above the poverty line and push as many of the above. The solution would be to find people who you can cheaply move up. But for instance the equal gains solution, the 3/4th 1/4th solution would be that you start from the bottom. And it's like, you start from the bottom and raise it to the second-highest and then you start raising this until you come to the third-highest and then push them all up as far as you can. That would be another way to do it. Or what I'm saying is that the theory of fairness is an incredibly rich theory. Fairness is something that a lot of computer scientists are interested in and in finding efficient algorithms for doing these things.

Q.6 Sir, at Miranda House, many of us want to pursue our Masters or Ph.D. outside India. How was your experience when you were pursuing it abroad, and your experience in academia?

I finished my Masters a long time ago, so we really didn't have that many choices. Now there are more choices. But generally, about research, there's much to recommend in research which is, the life of contemplation, rather than a life of doing things. There are enormous, enormous freedoms in research, you can do whatever you want to do, you make your own agendas, you can be ambitious, ambitious not in terms of making money, but in terms of making your contribution to the world of ideas, which is far more substantial. And it lasts longer than any other thing that you might be able to achieve in material terms. So if you just like thinking and wondering about things and learning about things, then I think it's a clear choice.

But it's not for everybody, because people like to see a connection between what they think and something which happens. So if you're such a person, who says, “I have this great idea, it must be used,” then I'm afraid academics is not necessarily going to be the most satisfying place for you. Because most of the stuff, almost all of it is mostly about exploring, understanding, and moving on. It's not like big things have happened. Solomon's problems were not, it was not that the Bible was changed because a bunch of game theorists decided something in 1980 or 1990. There are enormous attractions for academic life if I might say, basically in terms of the complete freedom to do and think as you choose which you'll never get anywhere else. So if you're an ambitious person, intellectual, then yeah, I would recommend the field.

It's not easy as well because academics have no hierarchies, so age will not buy you anything. If you're wrong, you're wrong. Even if a twelve-year-old kid can show that you're wrong, you have to swallow your pride and accept that this guy is smarter than me, he has a better argument than me. Just accept it and move on. It's a matter of personality. It's not that there are some people who are very smart and there are some people who are not so smart and all that, I think those things are much less clear. What is important is how much passion and love you have for something, whether you really want to do it and you feel like you're going to die unless you get the answer to that question. If you're that kind of person, then I think that you might consider academics.

Dr. Arunava Sen is a game-theorist and a professor loved by his students at ISI Delhi. We encourage you to look at his work https: //www.isid.ac.in/~asen/cv.html

Networked Firm and Its Impact on Labour and Human Resource Policies

Annavajhula J.C. Bose[*]

Textbook microeconomics theorizes business firms as single firms and is therefore inadequate to explain how modern industrial firms produce quality products at competitive costs, and in the process how they also choose to have in place particular employment relations systems in relation to different sets of employees. The theory of networked firm is examined here as an alternative. However, this alternative theory is not without empirical limitations.

Introduction

The evolution of modern industrial firm, especially in the motor vehicle industry, reveals that the single firm has vanished (IILS, 1992), and what has come into existence is the 'networked firm' in terms of inter-enterprise network or inter-firm relationships/linkages in the production system whereby the boundary of any single firm has got blurred. In such a production network, the lead firm is hypothesised to respond innovatively to the new competitive pressures by managing competencies on an intra-firm and inter-firm basis. To put it differently, it seeks to leverage more competitive advantage from its core competencies through alliances, partnerships and outsourcing with other firms. It meets the simultaneous needs for flexibility, quality and cost reduction in its operations by simultaneous implementation of internal competencies or capabilities development along with externalisation and quasi-internalisation strategies. This in turn gives us insights on the materialisation of diverse new employment patterns in the inter-enterprise production network.

This theory is actually a take-off on the Japanese collective capitalism in terms of the networked model of production organization, and it is the only way available to us now as a template for unravelling the relatively unexplored link between the world of corporate strategy and the world of labour studies. The theory cannot be attributed to any single author. It is brilliantly put forward with all its antecedents by Palpacuer (1997). A summary of her exposition runs like this.

The lead firms build and maintain their competitive advantage by: (a) developing core competencies on the basis of decentralisation, trust and strategic human resource management; (b) externalising standard competencies through the use of peripheral workers and/or peripheral suppliers/subcontractors; and (c) building cooperative relations with key partners performing closely complementary activities.

Such strategies are implemented both at the local level within a country and on a global scale, as the lead firms extend network links to other locations in a variety of countries. From the perspective of employment, these strategies generate new and complex labour segmentation patterns that are simultaneously situated within firms, between firms, and between locations.

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At the firm level, externalisation strategies produce segmentation between regular workers embodying the firm's core competencies, and peripheral workers performing more simple tasks, or tasks which are loosely linked to its core activities. At the inter-firm level, quasi-internalisation and externalisation strategies generate a segmented network structure between lead firms, first-tier suppliers/subcontractors and second-tier suppliers/subcontractors. Geographically, this segmented structure can be found both within core locations, and between core, semi peripheral and peripheral locations. Contracting, subcontracting and re-subcontracting as integral to the real world industrial organization is explored very well in Bose (2018a).

We elaborate this theory, selectively and briefly though, as follows by drawing on the exciting research in recent times in relation to the so-called best practices in the automobile industry.

Internal Development of Core Competencies

The lead firms specialise in and control service-intensive functions such as marketing, product development, network coordination and final assembly, which provide superior value and scale economies in today's competitive environment. These core competencies can be developed in the following ways.

A more flexible and responsive organisation dealing with various levels of coordination in a firm's activity is sought: coordination between individuals working in teams, between the various stages of the production process, between functional activities, and between business units of the large firm. The emphasis is on managing product flows, resource deployment and information sharing, with the objective of integrating individual tasks, functions, and units into a consistent and dynamic system. This involves greater reliance on horizontal coordination processes and a decentralisation of decision-making, together with a reduction of hierarchical layers within the organisation. For example, in the Japanese lead firms, horizontal communication processes are a central feature, and quality improvement involves organisational learning across functional divisions. Trust and shared values through a process of socialisation appear as central mechanisms for work coordination and control in the flexible enterprise. This is because when work is complex and constantly changing, 'direct control' based supervision becomes too expensive, and 'bureaucratic control' based on work standardization cannot be used. As such, strategic human resource management (Schuler and Jackson, 1999) which is contingent on the firm's environment, competitive strategy and organisational structure, is said to be used to promote employee commitment to the goals and consequent work of the organisation, foster employee initiative and creativity, and provide the firm with an adequate pool of individual competencies. This is done through HRM (human resource management) practice regarding the selection, development, appraisal and motivation of the workforce. Selection plays an important role when the firm relies on social norms and values to coordinate and control work. Selection criteria can be of an objective nature when applied to technical skills, but they tend to be rather general and subjective for evaluating work attitudes and values, or the ability of individuals to successfully operate within the organisation. Human resource 'development' relies mainly on job and task experience, i.e. on-the-job training, which is most conducive to the development of experiential knowledge. Such

experience can be gained through career moves and job rotation, with an emphasis on horizontal movements that allow individuals to acquire a systemic view of the firm's activity. The other option is job enrichment, allowing individuals to develop and make use of a variety of skills within a given position. Performance appraisal relies on a combination of objective and subjective criteria. The former can be used for evaluating results, while the latter apply to the assessment of work attitudes and behaviours, that best reflect the potential contribution of individuals to the organisation.

Motivation of the workforce depends on each country's context. In the Japanese firm, employees are motivated to engage in continuous learning and problem-solving because these activities are taken into account in performance appraisal, which in turn affects promotion opportunities and pay. Japanese firms also rely on financial incentives, through pay increases linked to promotion as well as the important use of bonuses as part of total wage payments. In the US, the use of financial schemes such as gain-sharing or profit-sharing is also an important feature of firms pursuing innovation strategies.

These features of the internal development of core competencies contribute to maintain a dynamic balance between cooperation and competition within the firm. Individuals cooperate within and across teams, functions and departments on the basis of shared norms and values, while competing to improve their positions in terms of pay, promotion and/or employment prospects. Such balance between cooperation and competition supports continuous learning and improvement within the firm.

Externalisation of Standard Competencies

There are three types of externalisation, applying respectively to the location of work, its administrative control and its duration. The externalisation of place refers to the growing use of homework, either through the informal sector or through institutionalised work programmes in major corporations. It also includes the geographical relocation of particular groups of jobs and activities. The externalisation of administrative control is based on the resort to temporary help service workers, leased employees, self-employed workers as well as subcontractors and business service enterprises. Reducing the duration of employment can be accomplished by hiring employees on a part-time or fixed-term basis, or simply without committing to a continuation of the employment relationship.

Externalisation on these lines presents several advantages for the lead firms engaged in developing their core competencies in service intensive functions such as marketing, product development and network coordination and/or final assembly. First, it is a way of increasing internal consistency in terms of activity, culture and human resource management practices since the externalised activities are associated with skills of a generic rather than a firm-specific nature. However, the skill content of externalised activities is not necessarily low, as firms might externalize specialised activities that require complex skills but are not tightly coupled to their main activity. Externalisation can help to preserve the cultural homogeneity of the firm by keeping out individuals with different norms and values. Likewise, maintaining internal pay equity might lead firms to externalise higher-paid activities in order to avoid pressures to upgrade the prevailing wage scale, as well as lower-paid activities that would have

to be compensated at a higher rate if performed within the firm. Conversely, externalisation allows firms to exploit cost differences between different types of workers.

In the Japanese firm, externalisation increases internal homogeneity as some employment categories are not integrated into the internal promotion system; they play a marginal role in the horizontal coordination of activity, teamwork and continuous quality improvement. They include part-time and temporary positions, which are predominantly filled by women while men hold the majority of regular jobs. Another kind of externalisation can be found in the important use of a deeply layered subcontracting of production in Japanese industries. Secondly, externalisation is a way of increasing flexibility. The workers who embody the firm's core competencies provide its main source of functional flexibility as well as some financial flexibility linked to performance-based pay. They also contribute to the firm's numerical flexibility through variations in the number of hours worked, as illustrated by the substantial use of overtime in Japanese and American firms. However, the importance of social cohesion and functional interdependencies within the firm puts some restriction on the numerical flexibility that can be obtained from core workers. Therefore, employment in core activities tends to be a fixed resource for firms engaged in competencies development strategies. In that perspective, externalisation provides the main source of numerical flexibility, allowing firms to meet fluctuations in output demand while buffering their permanent workforce from environmental turbulence. Externalisation can also be used to achieve some functional flexibility, as firms can access a variety of skills in the external labour market to perform special projects or meet unusual market demands. Likewise, financial flexibility is enhanced as firms can reduce their fixed cost by focusing competencies development strategies on core employees. Another cost advantage provided by externalisation relates to the fact that contingent workers, including part-time, temporary and contract workers, typically receive fewer benefits than do regular workers. Lastly, externalisation is also a way of maintaining competitive pressures on the core workers. Japanese employees know that they will be displaced to peripheral positions if they do not exhibit satisfactory performance. The American workers too face a similar alternative: "Contract firms and temporary workers serve as a constant reminder to permanent employees that their jobs, too, can be transformed or contracted out if productivity or loyalty falters. In this way, temporary help agencies and business services serve the same function as did immigration at an earlier point in history, providing a reserve army of alternative labour power that serves to constrain and discipline the permanent workforce" (Pfeffer and Baron, 1988, p.276).

Quasi Internalisation of Complementary Competencies

This refers to horizontal as also vertical cooperation between firms. Horizontal cooperation (or 'strategic alliances') refers to bilateral or multilateral arrangements between firms performing similar or competing activities. Through such arrangements, lead firms can pool resources to undertake projects that are beyond their individual capacities due to high costs, high risks and/or insufficient know- how. Horizontal cooperation also provides the most effective way to enlarge a firm's market base within the context of global competition. By contrast, vertical cooperation

allows firms to develop specialised capabilities at a particular stage of the production/value chain, while enjoying some of the advantages of vertical integration (i.e. complete internalisation). Lead firms benefit from economies of integration provided by their enhanced ability to coordinate complementary activities, both quantitatively and qualitatively. At the same time, they avoid the strategic costs of vertical integration, including higher fixed costs, reduced ability to change partners, non-access to suppliers' and customers' know-how, as well as reduced incentives to innovate as buying and selling occur through a captive relationship. Influential examples of vertical cooperation include the subcontracting relations developed by the Japanese and more recently, American firms, as well as the stable linkages between small firms in clustered craft industries and industrial districts.

The Japanese subcontracting networks are said to be showing cooperative relations based on trust, stability and joint-competencies development, even as they allow the lead firms to exercise significant control over their main subcontractors/suppliers.

It may be noted that subcontracting was developed by large Japanese firms in the postwar period on the basis of externalisation strategies aimed at reducing costs, weakening unions, and transferring risks to small subcontractors. However, during the following decades, firms reacted to new environmental pressures by transforming their subcontracting relations from 'market links' or 'arm's length transactions' to relational contracting based on trust, stability and competencies development, which is also hailed as the "fewer and closer" model of supplier relations.

In the automobile and electronics industries, large firms concentrated on strategically important activities such as product development and process innovation, had delegated to subcontractors a substantial number of manufacturing functions including not only assembly tasks, but also testing, parts procurement and design. Subcontractors were largely unequipped to perform these complex functions, and large firms played an essential role in helping to improve their capabilities. Large manufacturers concentrated and stabilised their contracting relationships in order to allow for the development of specific skills and knowledge by their main subcontractors.

Skills development, cooperation and control are closely intertwined in these new subcontracting relationships. For example, the joint determination of contract prices is based on the gathering by manufacturers of detailed cost data on subcontractors' activities. Instead of unilaterally asking for lower prices, manufacturers advise contractors on ways to lower their production costs and provide them with technical assistance in implementing needed improvements. Through the "grading system", subcontractors' performance is continually evaluated by prime firms in terms of product quality, price, delivery and other criteria. As their "grades" improve, subcontractors are given more responsibilities and long term commitment, which increases their motivation to develop specific skills and meet manufacturers' objectives. Thus, the development of relational contracting involves greater control by the large firms over the manufacturing operations of their main subcontractors. The latter benefit from know-how transfer, stabilised orders and enhanced growth opportunities, but their autonomy vis-à-vis their lead firms is greatly reduced.

It must be noted that the so-called cooperative linkages in the vertical supply chain apply only to primary subcontractors in Japan. The lead firms have a concentration of exchanges with key subcontractors to whom they have delegated the management of relationships with secondary subcontractors, thus forming a tiered subcontracting structure or a 'clustered control' system. While the first-tier or prime subcontractors perform complex functions, the second-tier subcontractors execute simpler tasks under their direction. These secondary subcontractors operate at the boundary of the network, as they maintain 'market links' with their clients characterised by unstable orders and strong pressures on price. Thus, the adversarial subcontracting relationships developed by the lead firms in the postwar period have been transferred to lower order contractors in the new network configuration. By contrast, the primary subcontractors have built a more diversified customer base, a trend which has been reinforced in recent years. The boundaries between first-tier and second-tier subcontractors are not fixed, though, as lead firms use the grading system to upgrade or downgrade their positions depending on performance achievements. If a first-tier contractor does not exhibit satisfactory performance, Nishiguchi(1994) indicates that it will be discharged or forced to become a lower tier contractor serving higher-tier contractors with better grades. Such a system introduces competitive pressures within the production chain or network, providing incentives for subcontractors to improve or maintain their network position.

To sum up, through stable partnership with first-tier subcontractors, the lead firms can effectively coordinate production activities, both quantitatively in relation to production volumes, and qualitatively with respect to product characteristics. The second-tier subcontractors provide additional flexibility to absorb fluctuations in output demand, allow lead firms to reduce their production costs, and maintain a competitive pressure within the network. From this perspective, the configuration of vertical networks presents similarities with the classic core-periphery labour segmentation model inside firms as identified by Doeringer and Piore(1971) and Loveridge (1983). The relative position of core and periphery employees within the firm is replicated at the level of inter-firm relations between core and periphery subcontractors, within the production network or chain.

New Forms of Labour Segmentation

The above segmented structure has important implications for employment. In Japan, secondary subcontractors are typically smaller than primary subcontractors, and smaller firms account for a greater share of disadvantaged workers in terms of age and gender. Employment conditions in secondary firms are characterised by low wages, high absenteeism and employee turnover, as well as strong variations in employment levels resulting from fluctuations in output demand. Thus, we arrive at a profound conclusion that employment conditions are strongly differentiated according to a firm's position within vertical networks or production chain.

To sum up, the competencies management theory of the firm throws light on work and employment relations outcomes as follows. First, the management model aimed at developing core competencies is transforming the employment conditions in the lead firms. Through strategies of greater internal flexibility, greater reliance on trust and shared value, as well as new priorities in their human resource management, these

firms are moving away from bureaucratic work structure and employment relations. In the transformed workplace, core employees are more exposed to competitive pressures and face declining prospects for stable career paths within a single firm. The new human resource management model also involves a shift away from the old industrial relations system which provided detailed rules for job classification, pay and promotion. For some scholars, this new model is in essence a non-union model, organised and regulated by the firm's personnel policy.

Secondly, through vertical disintegration, the lead firms are reducing the size of their core workforce and transferring activities to smaller production settings, that typically offer lower wages, fewer benefits, less employment stability as well as less opportunity for union representation. The growing use of contingent workers is also likely to increase the size of the peripheral workforce. However, networking strategies allow some small firms to improve their economic performance and employment conditions beyond what is suggested by traditional segmentation theory.

Such is the case of first-tier suppliers in vertical networks, that have reached an intermediate position between the lead firms and the second tier subcontractors. One more point to be noted is that in a network of shared authority, the ability of the unions to influence employment conditions within a given firm is increasingly constrained by economic interdependencies with outside organisations.

Thirdly, as new forms of network organisation get globalised, the privileged employment conditions that apply to the workforce in primary labour markets in a particular old location can get very badly affected. Global links produce new interdependencies between locations, so that the quality and quantity of local jobs are increasingly related to local firms' position within a global value chain, and to the nature of their relations to other network firms. In such a case, the regulation of local labour markets is constrained by the global dynamics of vertical networks. In core or semi-peripheral locations, local institutions might find it difficult to take actions aimed at reducing local segmentation without running the risk of losing jobs to lower cost locations. In peripheral locations, improving the quality of local jobs might run against providing incentives to attract business from foreign firms.

Conclusion via Critical Appraisal

The above theory of networked firm is the best we have got now to discern the changes in real world industrial organisation by way of value chains and production chains or networks at the national and international levels; but it suffers from lack of empirical proof to support the logic of nature and character of employment restructuring at the lead firms and first level subcontractors that it propounds.

What is needed is a "grounded theory" through empirical testing and revision of this logic (see Glaser and Strauss, 1967). Moreover, the experiential worker discourse needs to be compared with the spoken managerial discourse. That is to say, as Noon and Blyton (2002) point out, the employees' perspective could be diagonally opposite to the managerial perspective about how work and workplace relations get transformed in the way modern, large industrial firms reorganise themselves to cope with or beat competition in the marketplace. The ultimate purpose of this empirical research agenda is to find out if big employers treat labour as an asset or as a

consumable. Obviously, this is what counts in the labour welfarist perspectives of the goals and means of economic development.

The once-upon-a-time glorified Japanese model of industrial organization in terms of innovative lead firms and their supplier relations and labour relations, on which this theory is based, is conspicuous by its absence under the competitive and cost-cutting pressures of neoliberal, imperialist globalization, in Japan as well. Lazonick (1992), who had praised the rise of Japanese industrial leadership (Japanese collective capitalism) while accounting for the decline and fall of the industrial leadership of the US (managerial capitalism) and the UK (proprietary capitalism), has not acknowledged this generalised truth. He should have extended his analysis away from lead firms to supply chain management and labour relations, and he should also have looked at the organizational and labour relations features of the recent rise of innovative industrial leadership in South Korea and China.

There is mounting evidence from research on these lines to the effect that the value and production chains are, from top to bottom, full of 'lean and mean' firms surviving and thriving on 'disposable jobs regimes' of temp and permanently temp labour subject to excessive work intensification and other indignities associated with labour rights violations. High quality products at competitive costs are produced without high quality employment relations even at the lead and first tier firms in the value/production chains (Bose, 2018b; Pratap and Bose, 2017). The talk about change management (just-in-time and/or total quality management/total preventive maintenance and the like) for worker empowerment in this connection is a cruel joke and nothing but bullshit as demystified in Spicer (2018). Following Weissberg (1999), we can also take the management-speak about worker involvement, upskilling and empowerment as a fictitious promotion made by academics so that their careers might flourish from publications about uplifting!

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Research Papers

Using Expected Utility to Model A Murderer's Behavior: A Game-Theorist's Approach[1]

Aarti[2]

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This paper attempts to model a parent's behavior when they perceive their child's actions to have stolen their honor. The author uses the expected utility approach to perform an interesting behavioral analysis. This study aims to provide a useful insight to the administration who might wish to take steps to stop such crimes from happening and to the game theorists who might want to model the strategic interaction between possible murderers and rules.

Introduction

Almost every social system we know has had the past of putting their honor in a household's females' inability to make their own decisions and determining a person's occupation on the basis of their caste, religion, gender, etc., and in some regions, the color of one's skin. This has resulted in visible differences in social status within a community which then translates into a particular group of society ending up believing that it is superior to one group and inferior to another.

This makes an interesting case for game-theorists where multiple tools from the field could be applied. One such interesting tool is that of expected utility from two different strategies. The tool has been used by the administration, economists, all sorts of social scientists, to study the behavior of an agent of interest. The study of an agent's behavior can prove to be incredibly helpful in altering their response to a given situation. For example, an e-commerce site can use its customers' search history to offer various alternatives in a way that maximizes the firm's interests; police can study the behavior of a homogeneous group of a particular type of criminal and consider ways to minimize the probability of a person belonging to such a category attempting to commit the crime, or a professor could study how students behavior leads to most of them cheating in a home assignment and then design a mechanism or a system that would attempt to minimize the likelihood of a student engaging in such a malpractice.

This paper uses the tool of expected utility to model a parent's behavior when they face a situation that offers them with two strategies: to kill their kid or not to kill their kid. The intuition of the subject of this paper at times relates to the psychological aspect underlying the perception of honor for parents. This paper makes an attempt to

[1] This paper is a product of the Research Programme 2020 at the Department of Economics, Miranda House College. The author is indebted to Professor Saptarshi Mukherjee for his continuous guidance and support.

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discuss and model the behavior that underlies the decision-making process behind an *honor killing*[3]

Literature Review

Mayell (2002) discusses the intense gravity of the situation in various cultures in her work for National Geographic. There are thousands of women who are killed for honor. This points to the patriarchal roots of honor (*izzat*). Baker, Gregware, and Cassidy (1999) discusses the role of "*cultural and personal systems of honor"* that are an integral part of honor killings. Chesler (2010) provides an interesting analysis of worldwide trends in honor killings. Eisner and Ghuneim (2013) try to explain the role of aggressive behavior in the crime and Lowe, Khan, Thanzami, Barzy, and Karmaliani (2018) discuss the domestic violence cum honor killings. In an incredibly interesting study, Goldstein (2002) studies the biological roots of this crime.

This paper is one of the first attempts to try to model a murderer-specific behavior in an honor killing. The author hopes that this study would be a fruitful addition to the literature on the subject.

Study and Motivation

When someone from a relatively inferior group (generally a male) tries to marry into a so-called superior group (generally a female), it supposedly 'hurts' the latter's ego and their fraudulent honor.[4] (1) And to relieve themselves of the lifelong disdain from other members of the society the parents (most often belonging to the upper-class) decide to kill their own blood and the lover. Such killings are known to us as honor killings. From India to the US, it is hard to find a region which at least hasn't had a past of such killings. In fact, interestingly, according to a BBC study, honor killings are more acceptable than being gay in Arab nations.

As an economics student, I ask myself these questions when I come across articles where a father slaughters his own daughter to save his corrupt honor: Can we model this crime to determine the optimal punishment which could put an end to these events? Can we change the incentives to kill the couple into an incentive to maybe, at least, not commit an 'honor killing'? The paper attempts to enable us to try and answer such questions.

Study Design

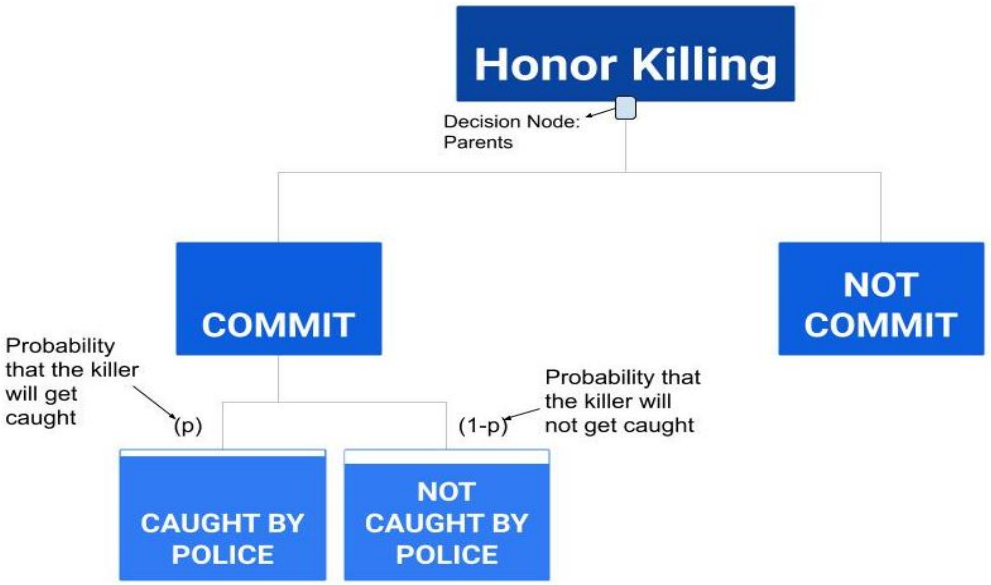
A parent is the decision-node. Their daughter/son has made them perceive that they have lost their honor. They are now faced with two strategies: 1. To kill the child, 2. To not kill the child. Whatever decision they choose to go with leads them to some satisfaction over a period of time. I compare the two utilities resulting from the two different actions. I then analyze the possible implication from this comparison and make it a point to highlight some key findings at the end.

The chart represents various possibilities when a child 'runs away', or do something which their parents perceive as staining their honor. The various possibilities arise

[3] Honor Killing typically refers to a family members murdering another familymember or friend in an attempt to restore their lost honor. Honor, I assume, is a psychological concept and hence such a murderer's perception of honor is different from what could be generally perceived.

[4] Latter's ego, and their fraudulent honor:- The belief that they are supposed to be privileged with protecting their beliefs as they want.

from whether they decide to commit or not commit the murder; the likelihood that the police will catch them after they choose to commit the crime, etc.



Model

I try to find an expression for **parents' payoffs**, which is basically the expected satisfaction that they get in terms of some relevant variables, corresponding to the 2 different strategies available to them- to kill (**K)** or not to kill (**NK)**.

Know Your Variables

Variable	**What does it depict?**
S	Utility/Satisfaction that a parent gets because of the perception of saved honor and appreciation/acceptance from their social circle.
N	The number of months they might end up spending in jail.
J	Negative utility/satisfaction from spending one month in jail.
s_d	Negative utility due to the perception of lost honor and social disdain.
U_j (s,n,j)	Utility function measuring the parents' satisfaction when they are caught, a function of s, n, and j.
U (s)	Utility function measuring the parents' satisfaction when they commit the filicide but are not caught.

Expected Payoff when the killing is happening, EP_K:

EP_K = Probability that killer is caught * U_j(s,n,j) + Probability that killer is not caught * U(s)

$= p * (s - nj) + (1-p) * (s)$

$= ps - pnj + s - ps$

$\mathbf{EP_K = s - pnj}$ ——————— **(1)**

Expected Payoff when the killing is not happening, EP_{NK}:

$\mathbf{EP_{NK} = s_d}$ ——————— **(2)**

Any rational agent, which here is one of the lovers' parents, would go with the strategy which gives them a higher payoff. In simple terms, if the expected payoff from killing their child is higher than that of from letting them stay alive ($\mathbf{EP_K > EP_{NK}}$), they will choose **'**to kill'- and vice versa.

What does $\mathbf{EP_K \lesseqgtr EP_{NK}}$ tell us?

$EP_K \lesseqgtr EP_{NK}$ translates into $\mathbf{s - pnj \lesseqgtr s_d}$ **.**

An administrator or a policymaker thinking of ways and measures to put a dot on such brutal filicides could maybe have a look at the condition above and deduce that doing so would require for the following conditions to satisfy:

$\mathbf{EP_K < EP_{NK}}$ **,** which is equivalent to $\mathbf{s - pnj < s_d < 0}$ $\mathbf{[\because s_d < 0]}$

$\mathbf{\Rightarrow s - pnj - s_d < 0}$

$\mathbf{\Rightarrow (s-s_d) - pnj < 0 \;\; ; (s - s_d) \& pnj > 0 \; [\because s_d < 0 \; \& \; s > 0]}$

⇒ (Utility because of the perception of saved honor and appreciation/acceptance from their social circle - Negative utility due to the perception of lost honor and social disdain) - pnj **< 0**

In a nutshell, if we are able to ensure that (s - pnj) is strictly less than s_d, parents end up not committing filicide. But, what is this inequality really? How do we read it?

Controlling Perception of Honor: s & s_d

What's helpful about the inequality "s - pnj < s_d" are the inferences that we can draw from it. Some important inferences from the above equation are:-

1. The variables, 's' and 's_d', translate into a society's perception of honor aka '*izzat'*. Greater the incidences and *acceptability* of honor killings more would be 's' and consequently, lesser would be the 's_d'. Hence, it would be harder for us to arrive at our final condition of s - pnj < s_d, and vice versa. Studies and observations support and verify this condition.
2. The equation tells us a lot about the other variables put into it too. One could infer that higher the penalty for committing the murder (i.e., **j**), lower would be the left-hand side of the equation and we would be closer to achieving the *optimal inequality.* Or, higher are the chances that such a case is reported and the murderers are caught (i.e., **p**), the greater the possibility for the society to satisfy the *inequality*.

We can think of a possibility where even a death penalty would be ineffective in making the inequality satisfy. With this in mind, think of a region where the disdain and *the feel* of losing honor i.e., 's_d' tends to *a very negative value* - a value maybe tending to infinity, or where the satisfaction and *the feel* of saving the honor tends to a *very high value* (maybe a positive infinity). There are good chances that no degree of

legal punishment could stop a perpetrator from killing their daughter or son. The instance of the court awarding the death penalty to the culprits in the Manoj-Babli murder case (which, however, never took place and the sentence was reduced later) and consequent rises in honor killings might be seen as one of the possible instances of this inference.

What should not be missed is the role that the administrators and the cops could play in stopping this from happening. Simply put, parents wouldn't be able to kill their children if the couple was provided the protection at the right time. A mistake in the protection of Manoj and Babli was primarily why they had got caught and killed. Police protection is all they can rely on while being chased for their lives. However, there have been instances when the police itself started hunting for the young couple who then didn't have a place to go.

Concluding Remarks

The model places an emphasis on the individual character of a particular region. This could explain why a penalty of a 10-year jail term could be enough in one region to stop the crime but a death penalty might come to be futile in another. This basic model reflects on the relative importance of penalty, social perception of honor, the involvement of the police.

The model takes into account almost all the factors involved in an honor killing. However, one might study the variables and the inequality to obtain a more sophisticated version of this set-up. My intent to have a model in the first place was to maybe infer some key points which we otherwise might not have been able to take note of. Importance of education relative to the duration or degree of a penalty, need to move away from the murderer-based behavioral model to providing protection to potential victims, reassure that the set model's intent was fulfilled.

So what do we do then? In the short-term, the administration must ensure that potential victims are provided with adequate security. Realizing the importance of change in the implicit functioning of a community and the significance of education in doing so- school education must teach its students about such 'bads' prevalent in their vicinity and enable them to question the underlying ideologies.

As far as perpetrators are concerned, behavior which comes out of notions of superiority and following deeply entrenched traditions is hard to be changed merely through awareness drives and strong penalty which are necessary, but definitely not sufficient. Nevertheless, attempts to educate such communities, emphasis on victim security, teaching the society's kids, and making sure that the culprit is given a bold sentence, must continue to be practiced.

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Climate Change and Agricultural Productivity in India[1]

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Abstract

India and other South Asian countries are highly susceptible to adverse climate impacts, present predominantly in hotter and less rich parts of the world. The mean annual temperature in India is estimated to go up by 2 degrees Celsius by 2050, mean precipitation is predicted to increase by 46.5mm in 2050 as predicted by World Bank (2019). Climate and weather shocks are detrimental to agricultural productivity, which in turn is a crucial determinant of agricultural incomes and food security. The agriculture sector in India contributes 16% to the GDP and offers 49% employment. This paper aims to establish a correlation between key climate variables- minimum and maximum temperature, precipitation, and CO_2 emissions- and agricultural productivity. It does so for two key crops in India- wheat, and rice.

Acknowledgments

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Introduction

Over the last couple of years, climate change and its impact on economies have been garnering attention. Climate change has the potential to drastically alter the traditional ways in which economies function. One threat that climate change and resultant weather variabilities pose is a decline in agricultural productivity. Agricultural production is directly tied to weather and climatic conditions. Understanding how climate change impacts agriculture becomes crucial, especially in the case of India, as it accounts for a large share in its GDP (16%) and an even larger share in employment (49%).[2] It is now clear that India and other South Asian countries are highly susceptible to adverse climate impacts, present predominantly in hotter and less rich parts of the world. The mean annual temperature in India is estimated to go up by 2 degrees Celsius by 2050, mean precipitation is predicted to increase by 46.5mm in 2050.[3] This paper aims to establish a correlation between key climate variables- minimum and maximum temperature, precipitation, and CO_2 emissions- and agricultural productivity. It does so for two key crops in India- wheat, and rice.

[1] This paper is a product of the Research Programme at Miranda House College, University of Delhi.
[2] https://bit.ly/38DcANq
[3] https://bit.ly/38G1k2R accessed on 23rd Oct 2019

Literature Review

Numerous studies have been carried out to measure the degree of impact of climatic variables on agricultural production in monetary and quantity terms. In India, it is expected that total farm net revenue may decline between 9-25% for a temperature rise of 2–3.5% (Masters et al, 2010). There have been several micro-level studies that map the local, regional or state-wise impacts of climate change on agriculture. Based on a cross-section analysis of crops, Ninan and Bedmatta (2012) suggested that climate change will vary across crops and regions and temperature increase is the most significant cause for declining agricultural production of crops in different parts of India.

According to Gupta et al (2012), a macro-level study of the impacts of climate change on agriculture, climate change is likely to reduce the yields of rice, sorghum, and millet crop productivity in 16 major agriculture intensive states of India. Another study by Kumar (2009) suggested that climate change will lead to a 9% decline in agricultural revenues in 13 states of the country. A rise in seasonal temperature is shown as the reason for declining productivity wheat, mustard, barley, and chickpea by Kalra et al. (2008). Geethalakshmi et al. (2011) found similar results for rice and mentioned that the productivity of rice has declined by 41% with a 4-degree increase in temperature in Tamil Nadu (India). Kaul and Ram (2009) studied the impact of rain and temperature on productivity of jowar production and found that excessive rain and extreme variation in temperature is adversely affected the jowar production, leading to negative consequences on the incomes and food security of farm-based families in Karnataka (India). Kar and Kar (2008) observed that low rainfall in Orissa affects the crop production and income of the poor farmers and concluded that investment in irrigation would improve farm income. Asha et al (2012) reported that the production of sorghum, maize, tur, groundnut, wheat, onion, and cotton had declined by 43.03, 14.09, 28.23, 34.09, 48.68, 29.56, and 59.96 kilograms per hectare respectively in the rainfed area in Dharwad district in Karnataka (India). This study also reported that almost 100% and 92.22% small and marginal farmers respectively suggested that the declining level of rainfall was the major reason for the reduction in the yield levels. Further, this study represents that changes in temperature and seasonal patterns were reasons for the reduction in the yield by 42.22%. Guiteras (2009) reports that crop yields will decline by 4.5-9% in the short-run (2010-2039) and by 25% in the long run (2070-2099) in the absence of adequate adaptation by farmers. Further, Burgess et al (2014) conclude that a one standard deviation increase in high-temperature days in a year decreases agricultural yields and real wages by 12.6 % and 9.8%, respectively, and increases annual mortality among rural populations by 7.3 % in India.

Methodology

Most studies on the impact of climate change on agriculture exclude CO_2 emissions as a variable. This study takes into consideration per capita CO_2 emissions along with the annual minimum and maximum temperature (all India) and annual rainfall. Data on per capita CO_2 emissions have been sourced for the years between 2002-03 to 2013-14 from World Bank. Temperature and rainfall data were taken from the Ministry of Earth Sciences, Indian Meteorological Department (IMD). Agricultural production

data was procured from the Agricultural Statistics released in 2018 by the Ministry of Agriculture and Farmers Welfare, Government of India.

The study uses an ordinary least squares (OLS) regression model to establish a correlation between per capita CO_2 emissions (in metric tonnes), minimum and maximum temperature, rainfall, and agricultural production for the years between 2002-03 to 2013-14. It studies this correlation for two crucial food grains in India- wheat and rice. Both wheat and rice are staple food items in India.[1]

Results and Discussion

Table 1 shows the effects of changes in climatic variables on the productivity of rice and wheat in India.

These results show that CO_2 emissions have a statistically significant positive effect on agricultural productivity. This sees some explanation in literature, wherein high levels of CO_2 emissions are observed in agricultural fields.[2] Thus we see that a 1% increase in CO_2 emissions leads to a 39.24% increase in agricultural productivity for rice and 46.46% for wheat. We also observe that as maximum temperatures rise by 1%, the quantity produced of rice falls by approximately 13%, whereas wheat production increases by 6%. A reverse trend is seen when minimum temperatures increase by 1%, wherein rice production increases marginally (by 0.622%), and wheat production falls by 7.5%. The direction of these trends could be explained by the fact that rice is a Kharif crop- so any increase in temperature beyond the norm during summers adversely affects the quantity produced. Similarly, any decrease in temperatures beyond the norm during winters adversely affects the quantity of wheat produced.

Table 1: Results

Variable/Crop	**Rice**	**Wheat**
No. of Observations	12	12
R-squared	0.944	0.945
Adjusted R-squared	0.9115	0.921
Annual Min Temp	0.622	-7.5
Annual Max Temp	-13.12	6.98
Co2 emissions	39.24***	46.46***
Annual Rainfall	0.0365	0.032
***= p value < 0.05		

[1] Saini and Gulati (2016)
[2] Pathak et al. (2005)

Limitations

While the regression model fits the data well, the study is limited in its scope due to a lack of data on the variables considered in this model. Climate and weather vary from region to region and the use of all-India aggregate values for temperature and rainfall might lead to a skewed picture of reality. However, these were considered only because the district and state-wise data were not available for use at the time of the study.

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The Monty Hall Problem and the "As If" Assumption Of Economics

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Abstract

The Monty Hall problem has been known to elicit incorrect responses from the majority of people who encounter it. Through this paper, the author formulated the problem as a choice decision, and compared how different cohorts either chose to switch or not switch when offered the choice; with the proportion of females who switched almost equal to proportion of males who switched, while younger people (ages 12-40) chose to switch more often than older people (ages 40 or above). But on the aggregate, people chose to stick with their original choice of door, and only around 7.25% switched, indicating that people do not always make choice decisions that conform to mathematical theory.

Keywords: Monty Hall problem, choice behavior, behavioral economics, "as if" assumption of Economics, optimal decision making, differences between decisions made by people of different genders and age groups.

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I would also like to thank all the respondents for taking out their invaluable time to fill out the questionnaire.

Introduction

In 1959, Martin Gardner wrote a column for the Scientific American Journal, which had a brain teaser, presented by Gardner to illustrate how even experts could make blunders in probability theory. The brain teaser given by Gardner in his column is now called the "Prisoners' Dilemma", and is touted to be the first instance where a "Monty Hall like" problem was formally presented and published.

In 1963, a television game show premiered called "Let's make a deal", in which the host, Monty Hall, played a number of games with contestants, one of which was a game that inspired the "Monty Hall problem" in mathematical literature. In the actual version of the game (and not the mathematical abstract version), contestants would be

presented with three identical doors, any two of which were known to have goats behind them, while one was known to have a car behind it. Contestants were then asked to pick the door that they thought had a car behind it. If the contestants chose a door with a goat, the door was opened immediately, while if the contestant chose a door with the car, Monty opened one of the remaining doors and then asked the contestant if they wanted to switch, often offering a sum of money to facilitate the switch.

The elusive nature of the abstract version of the Monty Hall problem truly hit the mathematical community on September 9, 1990, when Marilyn vos Savant, a columnist for the Parade magazine responded to a question, which is the following version of the game presented in "Let's make a deal" and this is the version which came to be known as the Monty Hall Problem:

Suppose there are three identical doors in front of you, two of which contain a goat, while one contains a car. You are supposed to pick the door you think has the car behind it. After you pick the door, the host, who knows which door contains what, will open a door he knows has a goat behind it. Now the host gives you a choice; you can either switch over to the other door or you can stick to your initial choice. Should you switch or not?

vos Savant answered that it would be better to switch and by way of explanation, said the following, "Yes, you should switch. The first door has a 1/3 chance of winning, but the second door has a 2/3 chance. Here's a good way to visualize what happened. Suppose there are a million doors, and you pick door number l. Then the host, who knows what's behind the doors and will always avoid the one with the prize, opens them all except door number 777,777. You'd switch to that door pretty fast, wouldn't you?"[1] That answer column caused uproar in not just regular readers of the magazine, but the mathematical community at large. vos Savant received hundreds of letters, stating, sometimes in overly condescending and patronizing tones, that she was completely wrong. It is noteworthy that these replies were not just from the general public, but also from professional mathematicians. Even Paul Erdos, one of the most famous mathematicians of the twentieth century got the problem wrong and also refused to accept the correct answer for quite some time, despite being shown the answer mathematically.[2]

The reason why so many people consistently gave the incorrect answer, even while understanding the probabilistic nature of the problem, is that they failed to understand the significance of Monty's revelation. The reasoning adopted by most people was the following: You choose one door; Monty opens a door which has a goat behind it. There remain two doors. Probability that the door you picked has a car behind it is then ½, as there are only two doors remaining, so it doesn't matter whether you switch or not.

Throughout modeling in economics, a good deal of mathematics, probability and statistics are used, especially in cases where optimal choice decisions are to be made,

[1] Rosenhouse, Jason, *The Monty Hall Problem: The Remarkable story of Math's most Contentious brain teaser,* (New York, Oxford University Press, 2009), p. 23 and Marilyn vos Savant, The Power of Logical Thinking, St. Martin's Press, New York (1996)

[2] Rosenhouse, *The Monty Hall Problem*, p. 54-55

and the general reasoning behind the usage of standard tools of mathematical optimization in such models is usually the following: People might not know the mathematics that goes into making these decisions, but they act "as if" they knew.

The Monty Hall problem is an instance that shows that people can make suboptimal choices, as against the optimal choices presented by mathematical theory, and thus serves as an important lesson; that we need to be extremely cautious in applying the "as if" notion of rationality in economics and other disciplines that seek to map out choice behavior of humans.

Literature Review

The Monty Hall problem has been approached largely in two ways, one to establish the correct strategy that should be followed to achieve the highest probability of winning a car, while the other approach has been to look into cognitive illusions associated with the Monty Hall problem, and what strategy people employed to win in the Monty Hall problem.

Jason Rosenhouse, in his book The Monty Hall problem, explains several ways in which the Monty Hall problem has been analyzed to arrive at the correct strategy. In what he terms the "Classical Monty", he forms a sample space to be consisting of triples: (1,2,3), where the 1^{st} element represents initial choice, the 2^{nd} element represents the door that Monty opens, while the third element represents the location of the car.[3]

He states, "Since Monty always opens a door with a goat, we know that the 2^{nd} and 3^{rd} elements of any triple must be different. Likewise, since Monty never opens the door you initially choose, we can assume that the 1^{st} and 2^{nd} numbers are different as well."

So, we have the following elements in the sample space:

S = { (1,2,1) (1,3,1) (1,2,3) (1,3,2) (2,1,2) (2,3,2) (2,1,3) (2,3,1) (3,1,3) (3,2,3) (3,1,2) (3,2,1) }

Now what are the probabilities associated with each of these triples? Are they equally likely?

Consider the elements where you initially choose door number 1.

P{(1,2,1)} consists of three events. Now, the probability that you chose door no. 1 is 1/3 (random choice). Since, the car is behind door no. 1 (probability of which is also 1/3), then Monty can open either door 2 or door 3. Thus, probability of opening door 2 is ½.

Similarly, we can arrive at all other probabilities in the sample space.

So, the question arises, what is the probability of winning if you switch?

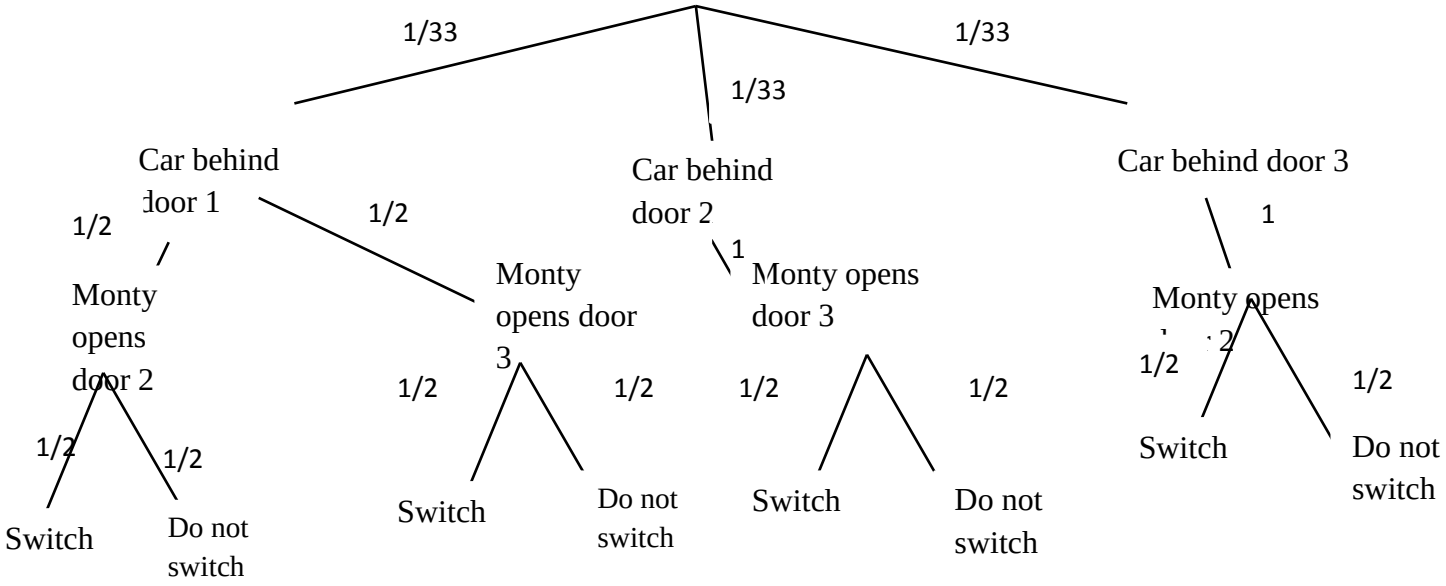
Probability of each of the terms where you can switch and you win is 1/9. There are 6 such terms. Thus, the probability of switching and winning is 2/3.

Similarly, the probability of not switching and winning is 1/3 (as there are 6 terms where you can win by not switching, and probability of each of those terms is 1/18)

[3] Rosenhouse, *The Monty Hall problem*, Chapter 2: Classical Monty

Rosenhouse also uses Bayes theorem to explain why the strategy adopted to win the game should be to switch, in what he terms the "Bayesian Monty". I will use a tree diagram to briefly explain this method.

Suppose player initially chooses door 1.



Thus, P (Winning| You Switch) = P(Winning ∩ Switching)/ P(Switching)

= (1/6+1/6)/ (1/2) = 2/3

Similarly, P (Winning| You do not switch) = 1/3[3]

Bapeswara Rao and Bhaskara Rao take a case of 4 doors, in an attempt to explain the Monty Hall problem, where one conceals a car and the other three conceal goats. You are then told to choose a door at random and then Monty opens a door he knows has a goat hidden behind it. Then, you are given a choice of either switching or sticking to initial choice. After you make your choice, Monty throws open another door which has a goat behind it, and again gives you a choice of either sticking to the door you selected in the previous stage or switching. Rao and Rao claim that in this case, the SLM, or Switching at the last minute strategy should be followed. This is because the probability that you picked a door that has a goat is 3/4 while probability that you picked a car initially is 1/4. If you stick with your initial choice, Monty will keep revealing the doors with the goats, and at the last minute you can make a switch to the door that is left.

Mitzenmacher ran a simulation using the software C, where once, he followed the strategy of only switching, which resulted in a win 66.708% of times, while when he ran a simulation following the strategy of not switching, it resulted in a win only 33.326% of times.

[3] Rosenhouse, *The Monty Hall Problem*, Chapter 3: Bayesian Monty

Many authors have tried to understand the psychological or cognitive aspect behind the Monty Hall Problem.

Burns and Wieth (2000), tried to understand why the Monty Hall problem creates issues for most people. They theorized that it was because of the causal structure of the Monty Hall problem; that people found it hard to reason out the problem, because it is difficult to grasp intuitively. They used another version of the Monty Hall problem, where there are 3 boxers, and one of them is the best, who will win every time, against any other boxer. You pick the boxer who you think plays the best, and the remaining two fight. You are then given the option of either switching to the winner of that bout, or sticking to your initial choice. They found that 51% of the participants switched in this case, as against 15% switching proportion in the original Monty Hall problem. This shows that people are more likely to solve the problem when the causal structure is easier to understand.

Granberg and Brown selected a sample of 114 undergraduate students and asked them to play the game 50 times and tried to see whether a proper winning strategy was found out by the participants over time. They found out that although there was a learning curve and participants began switching more often, they did not completely transition into the strategy of switching. Thus, they found that suboptimal behavior was persistent; that it reduced over time but did not vanish.

Herbranson and Schroeder made a novel study by analyzing choice decisions of humans and pigeons. For pigeons, there were 100 trials, where pigeons were kept in an operant chamber with three doors. Each door was lit with white light, and location of seed was randomly selected out of the three doors. When a pigeon pecked on a door, then one door was darkened, one not picked by the pigeon. Then, only the initial choice of the pigeon and one other door remained lit. Then, the pigeon pecked at a door again, and accordingly got the seed, if it picked the correct door. According to this study, after sometime, pigeons consistently switched on all trials, whereas humans only switched about 2/3rd of the time.

This is also to do with the gut level feelings of certainty of humans. Watkins, Derks and Dougherty found that participants would feel worse if they switched and lost rather than when they stayed and lost, i.e. regret for actions is greater than regret for inaction in humans, with one participant in their study saying, “It would stink if I switched and found out that I had the right one in the first place.”

Thus, the literature on the Monty Hall problem has shown two things:

1. The correct strategy for winning is undoubtedly switching
2. Humans, when faced with this problem, more often than not, opt for the strategy of not switching.

Most of the research on the Monty Hall problem has been to establish the correct answer to the problem, and of the research on the cognitive and choice aspect of this problem, researchers have not focused on the differences that can arise in choice judgment of different age groups, genders etc. and the research has not been extended to the analyzing optimal choice behavior in economics, which is what this paper seeks to do.

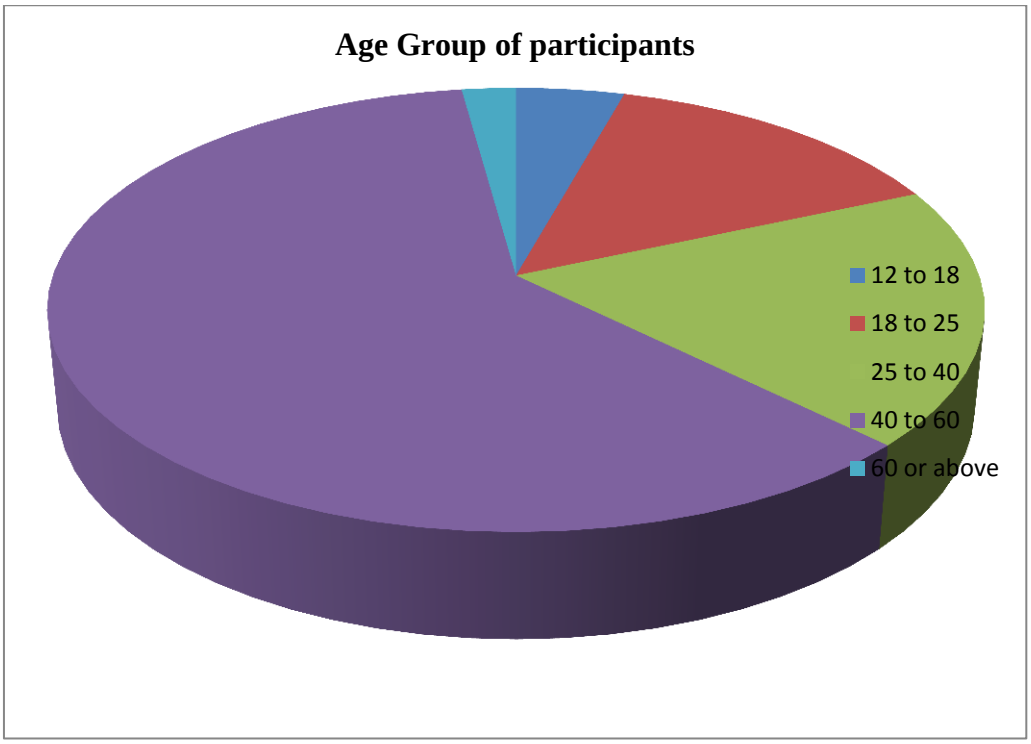
Methodology

Survey

A questionnaire was created based upon a pilot survey of around 30 individuals. The questionnaire was created as a Google form and sent out to many individuals, who voluntarily participated in the study. A total of 276 responses were recorded and then analyzed. (Refer to Appendix A)

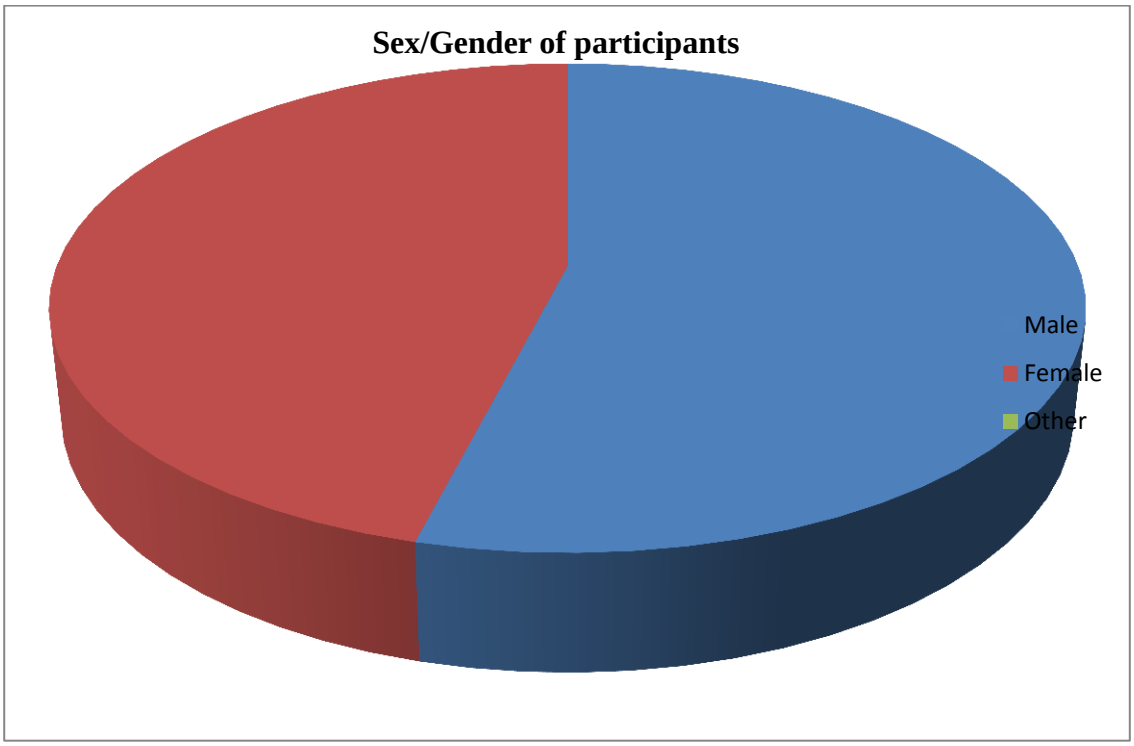
The sample was a snowball sample, consisting of randomly selected persons of various age groups, who each then contacted others to participate in the study.

Age Group of Participants



- 12-18: 12 out of 276
- 18-25: 39 out of 276
- 25-40: 52 out of 276
- 40-60: 167 out of 276
- 60 or above: 6 out of 276

Sex/Gender of Participants



- Males: 149
- Females: 127
- Others: 0

Variables

Apart from analyzing the choice of switching and not switching in general, the following variables have been considered and their impact on the above choice has been examined.

1. *Gender*: Gender is often thought to affect the way different people take decisions and approach choice problems. The popular understanding still remains that males take decisions and think about problems in a more logical and mechanical manner when compared to females who tend to rely more on their instincts. The author wished to test whether any such relationship appeared in this particular choice problem and whether male responses were significantly different from female responses.

   The author believes that this particular perception of difference between male and female understanding is purely a societal bias, and therefore expected to see no significant difference between male and female responses.

2. *Age*: Age plays a crucial role in the choice behavior of humans. People belonging to different age groups have a different understanding of this world, and form judgments and perceptions differently. This difference is often also reflected in the way people take decisions. In this particular problem, the author wished to see whether younger people (ages 12-40) approached the Monty Hall problem differently than older people (ages 40 onwards) and which people belonging to

which age groups could determine the answer correctly more often than others, if such a difference existed.

Simulation

An R simulation was also run, to corroborate the correct strategy in this game, with 276 trials run twice, to exactly match the number of responses in the survey.

Initially, the strategy followed was to switch on all 276 trials and observe how many resulted in a win, given that the car and goats were randomly allotted.

Then, the strategy was changed to sticking with the original door in all 276 trials and the number of times this strategy resulted in a win was also recorded.

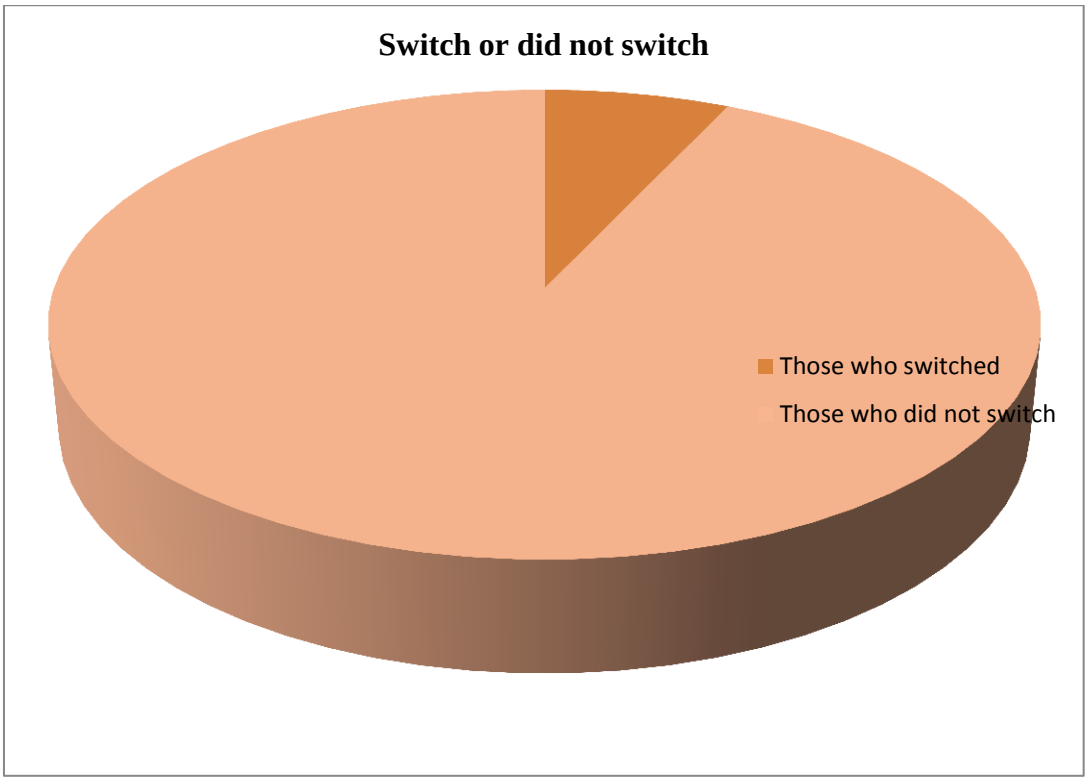
Findings and Analysis

Survey Results

1. Number of people who picked doors A, B and C

As is always taken, number of people who picked each door was approximately 1/3rd of the total sample, with approximately 35% picking door A, 33% picking door B and 32% picking door C.

2. Switching or not switching



- Those who switched: 20
- Those who did not switch: 256

The number of people who switch doors when given the option is just 20 out of 276, which is around 7.25%. Thus, the probability of people switching is not ½, but much lesser.

Around 90% of the people who chose to stick with their original choice said that gut feeling guided their decision; either they used these words directly, or rephrased it by saying that they felt that their initial choice was correct. Around 7% said that there were equal chances of getting either car or goat after one gate had been eliminated, so why switch, while the rest gave no specific reason.

What is apparent from this is that this problem in particular, is not viewed by participants as a problem of probability, and since they cannot connect the additional information in any manner to the problem at hand, they tend to stick with instinct and gut feeling.

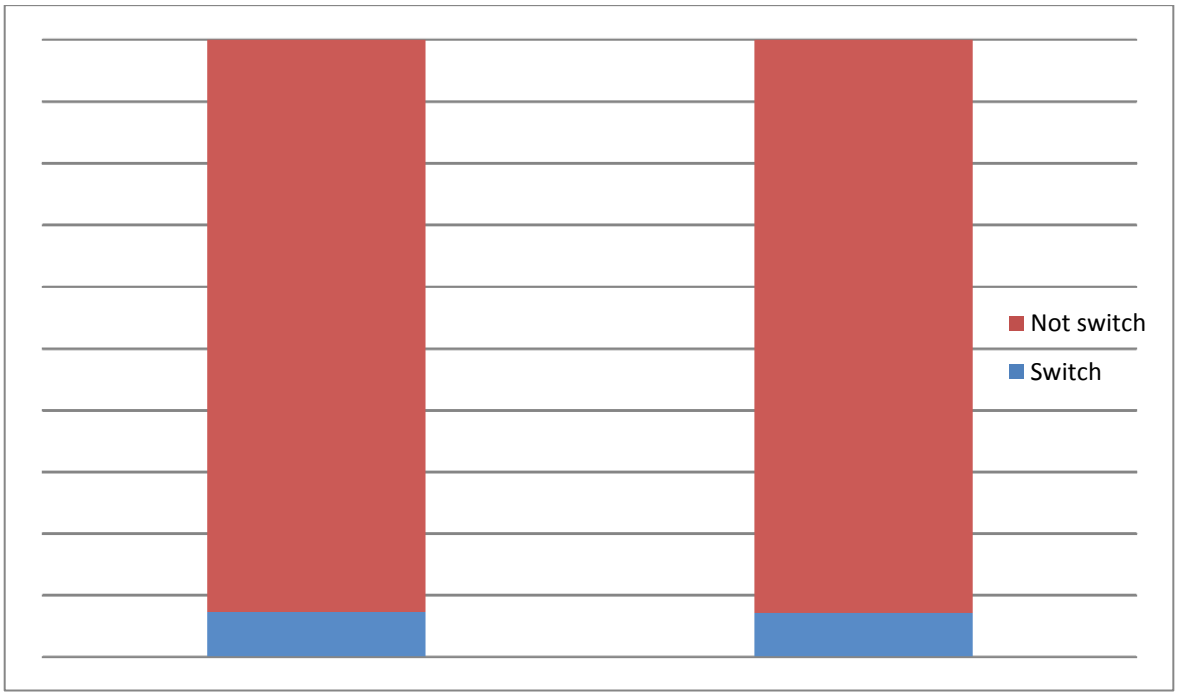
Of the 20 people who switched to the other door, 11 knew the game and how it worked and so answered accordingly. The rest of the participants either said they had a hunch that the other door might have the car behind it, while the rest provided no specific answer. Only one participant worked out the probabilities correctly, saying that he had a chance of 2/3 of getting the door wrong and hence should switch.

3. Male vs. Female

Often it is touted that males "approach" problems in a more logical manner than females, who rely more on their instincts. This is not the case in this mathematical problem. Both males and females have almost equal difficulty in understanding the structure of the problem, and both males and females said that they chose to stick to their choice because of gut feeling.

Out of 127 females, 9 chose to switch, i.e. 7.1% chose to switch, while out of 149 males, 11 chose to switch, i.e. 7.3% chose to switch.

Thus, in this problem also we see that males and females both approach the problem similarly, provided similar rationale for their choices, and tended to stick to instinct.



4. Age Groups

a) Of 11 participants in the 12-18 years of age category, 2 decided to switch (16.66%); one gave the reason of guessing, while the other was the only participant who worked out the probability of the problem correctly and gave that as a justification for switching (9.09%).

b) Of 39 participants in the 18-25 years of age category, 5 decided to switch (12.82%), of whom 3 knew how the game worked (7.69%), and others had a hunch that the other door might be correct.

c) Of 52 participants in the 25-40 years of age category, 4 decided to switch (7.69%), of whom 2 knew how the game worked (3.84%), while the rest either did not provide a specific answer or said that they had a hunch.

d) Of 167 participants in the 40-60 years of age category, 9 decided to switch (5.38%), of whom 6 knew how the game worked (3.6%), while the others did not provide specific answers.

e) Of 6 participants in the 60 or above category, none switched.

Age Groups	**Number of participants**	**Those who switched**	**Those who did not switch**
12-18 years	11	2 (16.66%)	9 (83.34%)
18-25 years	39	5 (12.82%)	34 (87.18%)
25-40 years	52	4 (7.69%)	48 (92.31%)
40-60 years	167	9 (5.38%)	158 (94.62%)
60 or above	6	0 (0%)	6 (100%)

There is a clear indication that the younger participants switched more often than the older ones, although it can be said that more of the younger participants had knowledge of how the game worked than the older participants (in percentage terms). This could also be because a lot of the younger participants who were targeted were school and college going students who may have recently encountered this problem in their probability classes.

Even then, across age groups too, the probability of switching is never higher than around 16%, which shows that across age groups people tend to rely more on their instincts, although younger participants can be claimed to have the advantage of recent probability and statistics classes to help them in this regard.

Thus, in general, across genders and age groups, participants showed a high tendency to rely on their own subjective judgment and view of the problem. Thus, it can be conclusively stated that the notion that people will always intuitively act in a manner that corresponds with mathematical results is not true, as mathematical results are often arrived at by rather counterintuitive measures.

Computer Generated Simulation Results

Using Simulation in R, the following results were found:

1. By running 276 trials and following the strategy of not switching for all, won the game 32% of times and lost 68% of times
2. By running 276 trials and following the strategy of switching for all trials, won the game 64% of times and lost 36% of times.

Thus, even in this case where sample size is 276, we establish that if all the people had followed the strategy of switching, around 64% of them would have won, and around 36% would have lost as against the strategy of not switching, which leads to loss more times than victory.

Other Findings

1. Confidence Interval for Population Proportion:

X= number of people who switch

n= 276

p= actual proportion of those who switch

Then, $p = X/n \widehat{=} 0.07246$

Since, X is binomial and n is large, then, $X \sim N(np, npq)$

Then, $p \sim N(\widehat{p}, \sqrt{(pq/n)})$

Thus, using a 95% traditional confidence interval, we have,

$$p \pm z\sqrt{(pq/n)} = 0.07246 \pm 1.96\sqrt{[(0.07246)(0.92754)/276]}$$
$$= 0.07246 \pm 1.96\sqrt{(0.000243512857)}$$
$$= 0.07246 \pm 0.03059$$

Thus, Confidence interval is (0.04187, 0.10305)

2. Confidence Interval for Male and Female Population Proportion:

X_1 = number of males who switch

X_2 = number of females who switch

$n_1 = 149$

$n_2 = 127$

where n is the sample size of males and females respectively.

p_1 = true proportion of males who switch

p_2 = true proportion of females who switch

$\theta = p_1 - p_2 \sim N[p_1 - p_2, \sqrt{(p_1q_1/n_1 + p_2q_2/n_2)}]$

Thus, a 95% confidence interval is obtained using the traditional method for θ, (which is the difference between the true proportion of males and females who switch) which is, (-0.05915, 0.06315).

Thus, it can be said with confidence level of 95% that 0 will belong to the interval of the true difference between population proportions of males and females who switch. Thus, the true proportion of females and males who switch will be almost equal.

Conclusion

The objective of this paper was established at the very beginning as being twofold:

a) Examining the choice of switching and not switching of people in the Monty Hall problem and establishing differences across genders and age groups, if any existed.
b) Placing the obtained result in the context of optimal and suboptimal choices made by individuals as against optimal and suboptimal results according to mathematics.

This study showed that people made the choice of sticking to their initial choice across genders and age groups, and although a relatively larger proportion of younger participants opted to switch, this can be attributed to the fact that the targeted population of younger participants was the school and college going students.

Of the 276 participants, only 7.25% chose to switch, and of the 256 participants who did not switch, around 90% said that they did not do so because of gut feeling or instinct.

According to mathematical theory, there exists a clearly established optimal strategy, as discussed in the literature review, which is to switch at all times. Participants however did not switch most of the time, sticking with their instinctive choice. Most did not even approach the problem as a probability problem. This clearly shows that we cannot always assume that intuition will guide individuals in making mathematically optimal choices.

Thus, when examining human choice behavior, we need to be extremely careful before working with the assumption that the optimal strategy established by mathematics is the one that people will also follow, as they will act "as if" they knew the mathematics, because mathematics can often be counterintuitive.

This is especially true of economics, where in both macroeconomics and microeconomics, the "as if" assumption of rationality is prevalent i.e., people are rational if they take decisions according to certain mathematically optimal strategies, else they are not. This is also something we need to be wary of and we should define rationality in accordance with human behavior and not mathematical optimization.

Appendix A

Questionnaire

1. What is your age?
   a) 12-18
   b) 18-25
   c) 25-40
   d) 40-60
   e) 60 or above
2. What gender do you identify with?
   a) Male
   b) Female
   c) Other:
3. You are asked to play a game. There are three doors in front of you labeled A, B and C. Two have them have a goat behind them, while one has a car behind it. You do not know which door has what behind it and you are asked to pick the door you think has the car behind it. Which door do you pick?
   a) Door A
   b) Door B
   c) Door C
4. Now that you have picked Door A/B/C (according to what the participant picked), it is revealed that Door B/C (according to what the participant picked; door A had the car behind it) has a goat behind it. You are now given an option: you can either choose to stick to your initial choice or you can switch over to the other door. What do you do and why?
   a) Stick to initial choice
   b) Switch over
   c) Reason:

Note: All questions and subparts were compulsory.

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The Spectre of Jobless growth and Income inequality - In light of globalization

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Abstract:
The growth of any economy is accompanied by the creation of jobs and growth in the incomes of the workforce of a country. The income growth is followed by rising consumption and in this way this virtuous cycle pushes people out of poverty and transforms developing emerging economies into developed ones. But the phenomena we are witnessing these days is somewhat different- job growth is hardly keeping pace with economic growth, and the problem of unemployment persists. The topic of trade and wage inequality already features a research agenda in contemporary trade theory. What we show in our paper is that trade policies often give rise to unemployment and a subsequent informalization of the economy, indicative of a structural shift in the economy. Accordingly, we consider two world economy- a home country and a foreign country. The home country is a SMOPEC and characterized by 3 sectors- Capital intensive sector (X), Medium and Small-Scale Sector (Y), and informal sector (Z). Hence our model takes into account 2 commodities and 1 service, with three factors of production. We assume full employment of factors in the economy and fixed factor coefficients. The price structure follows a perfectly competitive framework. Further we assume CRS production function and homothetic preferences. We assume that Sectors X and Y employ the vast majority of middle-income groups. We divide the middle class into upper middle class with the necessary skill set to classify as skilled workers and lower middle class comprising of unskilled workers operating under unionized conditions in sector Y and under a competitive framework in sector Z.

JEL CLASSIFICATION: - E24, F16,F14,F66

Keywords: International trade, Jobless Growth, Skilled Labour, Unskilled Labour.

Section 1 : Introduction to Jobless Growth, Income Inequality and International Trade

The topic of trade and wage inequality has already featured as an important research agenda in contemporary trade theory. Globalization, as we know, is a process of integrating a country's economy with the economies of other countries across the world. Such integration is facilitated by an increasing volume of foreign trade and investment. Major task of an economist is to work out the welfare implications and distributive perspective of such a transformation. With respect to the distributional effect in particular, there has been a noticeable empirical phenomenon that suggests a considerable decline in the income of unskilled labour and in the decline of their employment relative to the skilled segment of the labour force(Substantial research

work has been devoted to this topic Bhagwati (1995), Davis(1998), Margit Acharya(2003)). Hence, the general trend has been an increase in the ratio of skilled to unskilled wages.

During the last decade, we saw that the growth rate of labour force (2.33%) was significantly higher than the growth rate of employment (1.9%), which was several times less than the growth rate of the economy. According to the 2011 census, the growth in the economy was around 8% while the growth in employment stood at a measly 1.9%.

We also refer to the National Sample Survey Office (NSSO) data on employment that revealed that during the time periods of 2004-2005 and 2009-2010 only 1 million jobs were added while the economy averaged a record of 8.43% growth annually. Hence, we see that the economy could not accommodate the rapidly growing labour force. A HDFC Bank report on India's tanning jobs growth rate says that employment elasticity (percentage change in employment due to a 1% change in GDP) is almost zero. For every one-point rise in GDP, the growth in jobs is 0.15.

Rising middle class in India: intuitive rationale behind taking middle class as the target group of our analysis

In this paper our main focus has been to highlight the many layers within the middle class and to study the adverse effects of joblessness and income inequality on it. India's rapid rise and growing middle class has varied implications for evolution of democracy and economic choices. A large proportion of all services is produced by bankers, accountants, engineers, and scientists whose output is used by firms producing goods. Sector X in our model is service oriented and the skilled labour it uses comes from the middle class due to the economic rationale provided as above. These bankers, engineers, doctors constitute a major part of the middle-income group. Thus, it is safe to say that middle class forms a major portion of the services employment.

The explosive growth of India's service sector has helped pull millions of people out of poverty, creating a huge middle class. Half of India's population of 1.3 billion is now middle class. The Indian middle class has doubled in size over an 8-year period from 300 million in 2004 to 600 million in 2012.

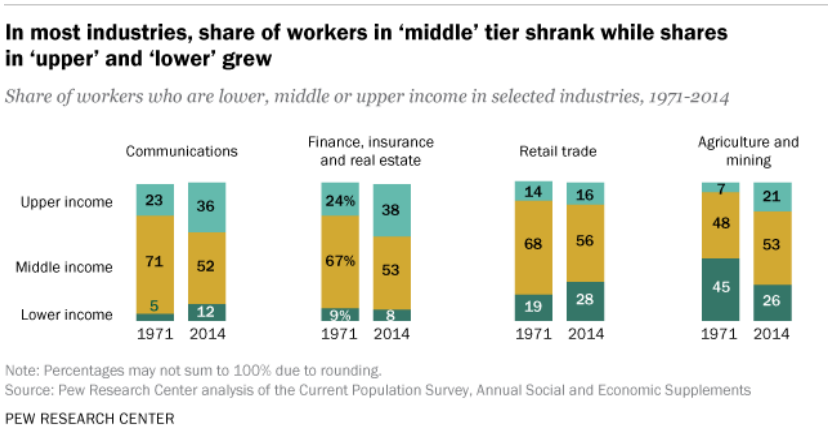


Fig:1

The above diagram shows that services like communications and finance, insurance and real estate employs more than 50% of their employees from the middle class. Any policy that affects trade in services has a huge impact on the middle class.

Not only in the case of service, but we can safely say that the unskilled workers employed in small and medium scale industry comes from the lower middle tier of the middle class and these are the industrial workers. Hence it is the middle class which is the focal point of our analysis. Conceptualizing the effect of trade, unemployment, jobless growth is our primary concern.

Section 2: Literature Review

There exists an extensive amount of literature on the subject of our paper.

We have drawn several references from Rajat Acharya and Sugata Margit's paper on "Trade Liberalization, Skill Linked Intermediate and Two-Sided Wage Gap" where wage gaps are shown to be an outcome of trade liberalization. We have also looked up Sheba Tejano's work on Jobless Growth in India(2015),where she finds that a shift in the composition of demand towards higher-productivity sectors and forces of international competition have generated pressures to adopt more capital-intensive techniques of production in India, causing growth without a rise in unemployment as well as a growing wage gap.

Section 3:The Theoretical Framework

We consider a dual globalist framework consisting of a Home Country and a Foreign Country. We consider the Home Country to be a SMOPEC. We consider 2 consumption goods (final consumption) and one service good, with 3 factors of production-skilled labour, unskilled labour and capital. Here, we assume explicitly that the labour force mentioned here is the middle-income bracket population spread across the formal and informal sectors. We assume full employment of resources and fixed factor coefficients. We consider a production structure, where the Home country exports X, Y is the import competing sector Z is the ideally non-traded sector. Initially our home country imposes an ad-valorem tariff on the import of Y from the foreign country, keeping in mind the adverse distributional consequences of a free trade regime in the developed world.

All the markets are assumed to be perfectly competitive, and the production function for the final goods and services exhibit CRS and diminishing marginal productivity. We assume homothetic preferences so that relative demand depends only on the relative price of the good. This standard HO assumption is employed to rule out any real income or country size effect and we keep our analysis simple.

One of the major features of our model is the inclusion of the segmented input market, which is a typical feature of many developing countries, hence the idea is extremely relevant. The formal unskilled labour market with the minimum wages coexists with the unorganized informal sector where the money wage varies with the demand-supply changes. In our model these are the 2 goods Y and Z. Informal Sector Z is characterized by a comparative lower wage than formal sector Y which is unionized.

Accordingly, we use our theoretical framework to put together asymmetric changes in the relative wages of workers, with different levels of skills and trends in the employment of unskilled labour.

Effect of liberalization of trade

In the simple model that we propose in the paper, fall in employment and the rising wage gap turns out to be an outcome of liberalizing trade. When trade is liberalized t falls as t falls, domestic price of Y goes down. According to Stolper Samuelson Theorem, as price of commodity falls the return from the factor used relatively intensively in that sector must fall. Hence 'r' falls. As 'r' falls, foreign capital falls and consequently K falls, feasible production space for Y shrinks and what we get is a Rybzynski type effect, where the production of relatively capital-intensive Y must fall, hence sector Y shrinks.

Since the endowment of unskilled labour does not change as Y falls, Z rises because of the assumption of the perfect mobility of unskilled labour between different sectors. The retrenched workers are absorbed by sector Z. The consequent reallocation of labour to Z results in the expansion of that sector. The growth of the informal sector Z coupled with the growing unemployment in the formal sectors can be called the 'informalization of the economy'.

Hence trade is responsible for the structural change of the economy, by pushing unskilled labourers away from the secured formal sectors into the insecure, low wage paying informal sectors. Our economy thereby observes a prospect of jobless growth that has ramifications for everyone.

However, since the price of good X remains unchanged, with the rate of return to capital falling, in such a setup this would lead to a rise in the skilled wage. Hence the change in the urban income is ambiguous, whereas the income of the capitalist is falling, that of the skilled workers are being benefited.

As sector Z expands, falls, wage of unskilled workers in the formal sector falls in order to absorb them. Hence increased foreign trade has increased wage inequality in almost every part of the globe. We observe that the relative wage ratio is steadily rising, creating a wedge between the upper middle class and the lower-middle- and lower-class income groups as the economy moves from free to restricted trade.

Income Inequality in the Economy:

Hence, from the above discussion we say that the mathematical interpretation concludes that the wage of skilled labour goes up and that of unskilled workers decreases in a liberalised trade regime. This means that the upper middle-income group benefits from trade liberalization as their income rises. The income gap between the lower class and the lower middle-class group is waning and that of the higher and upper middle class is shrinking leading to creation of a gripping hole of inequality within the middle class.

We illustrate out argument in the following graphs:

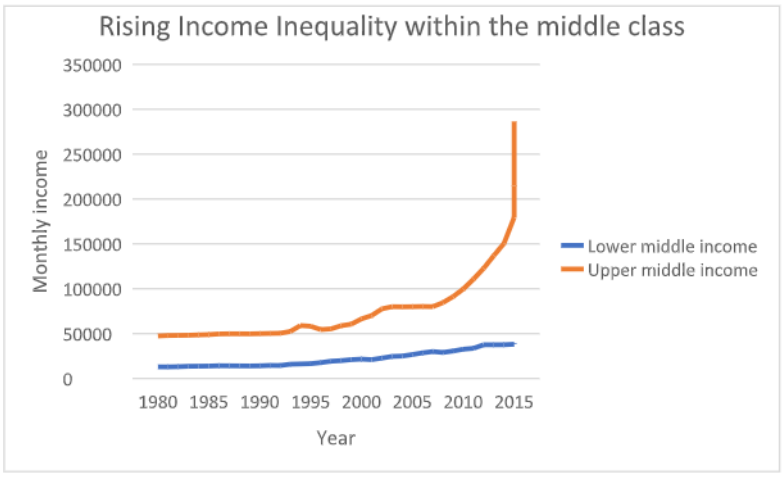
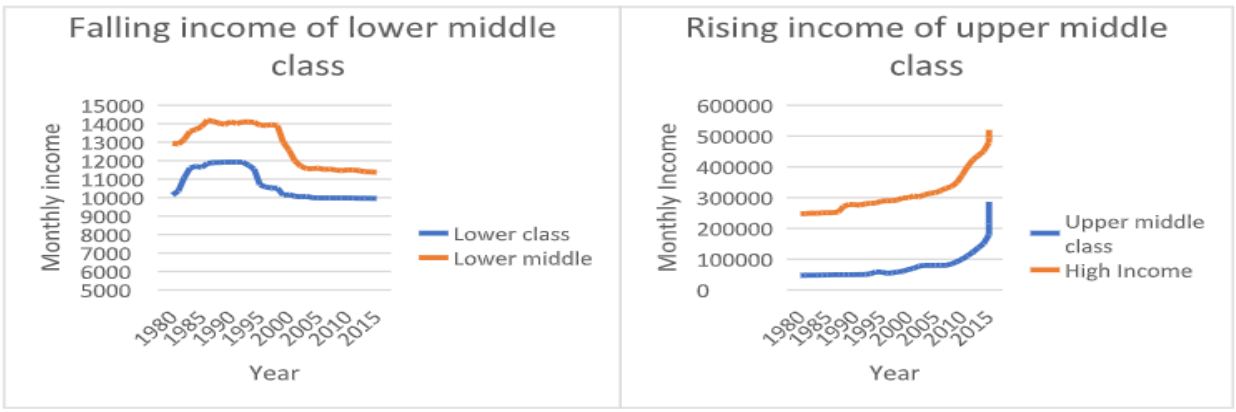


Fig:2



Source:https://www.ilo.org/ilostat/faces/wcnav_defaultSelection? dv7itgq_4

Fig:3

Rising income inequality in India and the rural-urban divide

Since the mid-1980s, Indian Government gradually adopted market-oriented reform policies leading to trade liberalization, resulting in rural urban inequalities. It is notable that during the reform period urban inequality in India was much higher than rural inequality. And this can be attributed to the rising wage gap between upper and lower middle class in urban population. In the following figure we have compared the urban and rural Gini coefficients over the years.

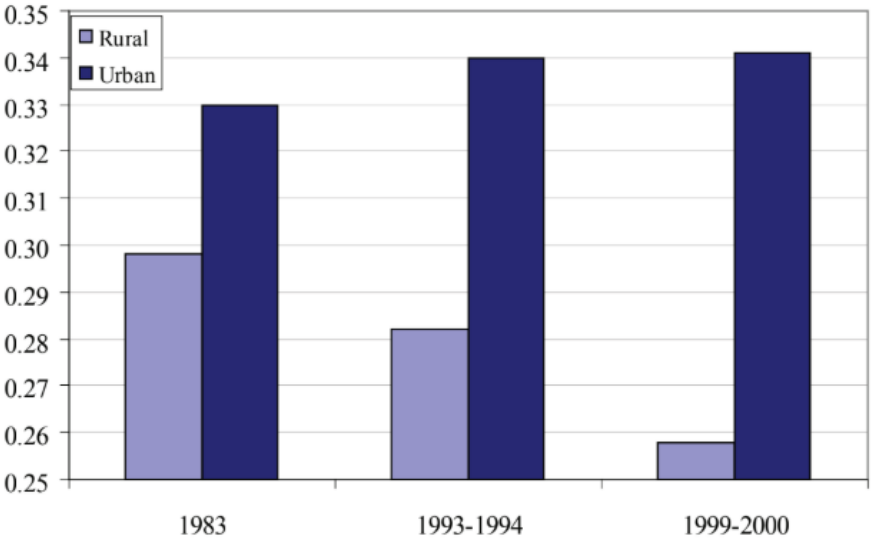


Fig:4

Also, the indices of rural per capita consumption by fractal group indicates the same phenomenon (Banerjee and Piketty (2001)). In the following figure we have highlighted disproportionate high income/consumption gain of the upper tier of population. Hence urban inequality has increased considerably.

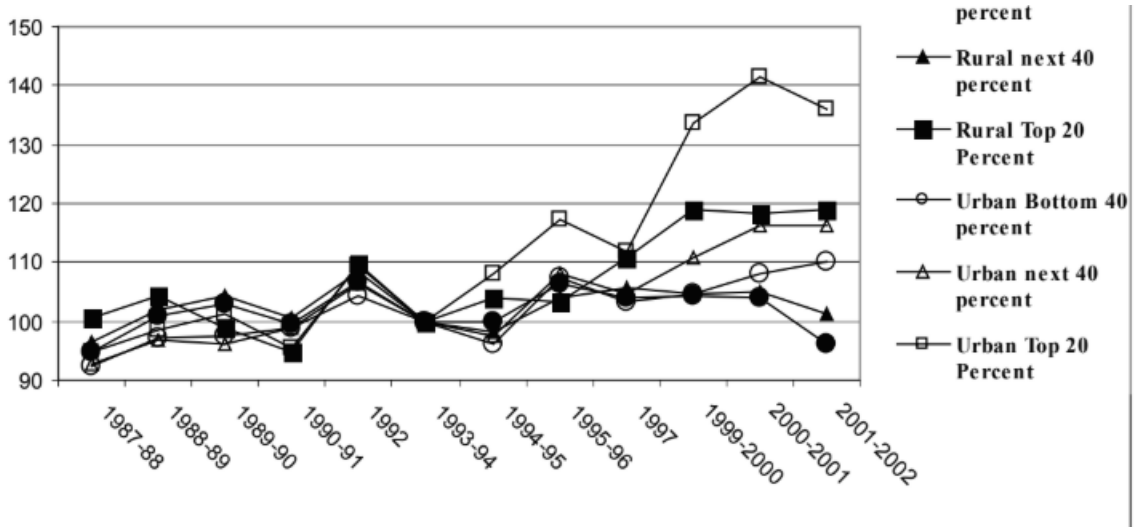


Fig:5

One of the major objectives of our paper is to understand the wage gap phenomenon. In developed countries like the US and European Union, we have seen that considerable decline in income of skilled labour and a decline in their employment relative to the more skilled segment of the workforce has roughly coincided with the phase of globalization and international trade.

According to the Gini coefficient, income inequality in India has been rising since the 1980s when 30-35% of national income went to 10% of earners and it has been steeply increasing after the period of globalization and liberalization. One of the reasons we have considered India to illustrate our case, is that the issue of poverty and inequality is far more important in developing countries because of the alarming and overwhelming proportion of population below the poverty line.

GDP has grown at more than 5% since the 1980s. The acceleration in growth rate was more than 9% in 2005-06.The upward trend is noticeable from the following diagram:

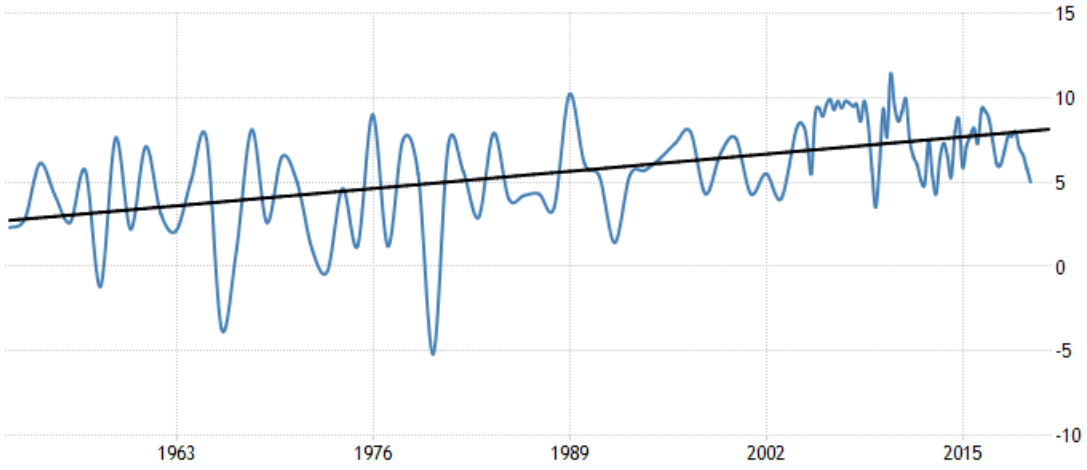


Fig 6

What is noticeable that the rise in GDP has been accompanied by a steep rise in the increasing concentration of wealth among the top. The top 1% now accounts for more than ¼ th of the total wealth as evident from the following figure.

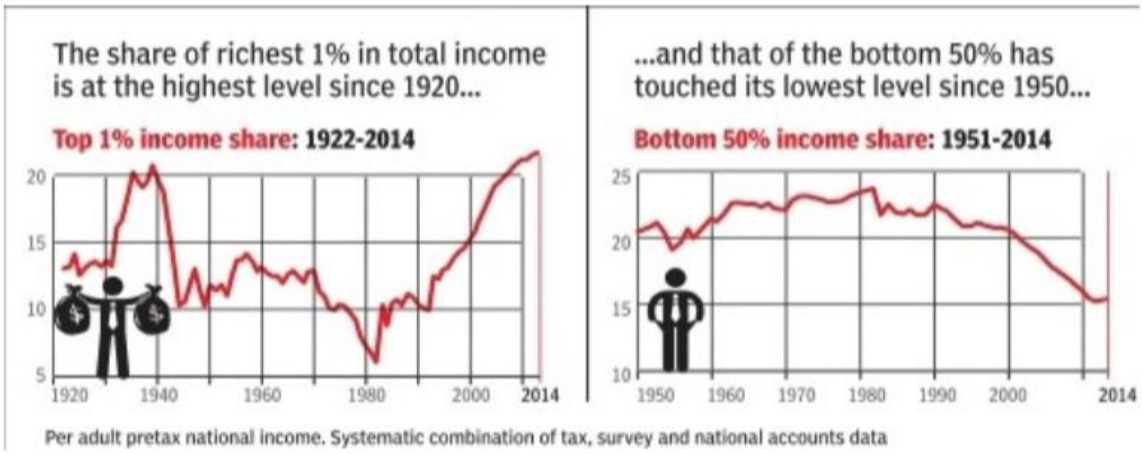


Fig.7

We see that the income of the bottom 50% has touched its lowest level.

Computing the income bracket of these high earners and low earners to their job profile, it is realized that while the low earners are ones engaged in small factories and construction workers, high earnings are capitalist earning and skilled labour, i.e., the urban middle class group. This is line with the findings of the paper.

Theil's Index:

In our previous section we have measured inequality with the help of the Gini Coefficient, which, as we know is the most commonly used measure of inequality and shows income distribution by plotting population percentage in cumulative figures and similarly for the income figures as well. However, one of the major drawbacks is that it concentrates more on the share of income rather than the absolute value.

Also, it is sensitive to inequality between rich and poor. In our paper since our major objective is to analyse the rising income inequality between the members of a particular class and thus, we use the Theil's index to address this issue.

Formula

Theil's index T of inequality within a group is calculated as:

For a population of N individuals each with income x, the situation may be represented by the list x_i (i=1,2,…,N) where x_i is the income of individual i

$$T = \frac{1}{N}\sum_{i=1}^{N}\frac{x_i}{\mu}\ln\left(\frac{x_i}{\mu}\right)$$

where μ is the mean income

$$\mu = \frac{1}{N}\sum_{i=1}^{N} x_i$$

Theil's index T_T of inequality between groups is calculated as:

$$T_T = \sum_{i=1}^{m} s_i T_i + \sum_{i=1}^{m} s_i \ln\frac{\overline{x_i}}{\mu} \quad \text{for} \quad s_i = \frac{N_i}{N}\frac{\overline{x_i}}{\mu}$$

Where the population is divided into m subgroups and

s_i is the income share of group i

N is the total population and N_i is the population of group i

T_i is the Theil index for that subgroup

$\overline{x_i}$ is the average income in group i

μ is the average income of the population

(For large populations, classify the population into k mutually exclusive and mutually exhaustive categories of relatively homogenous income groups and treat these categories as individuals while calculating Theil's index T_i for a sub-group)

Dividing the entire population into 3 broad groups-lower income, middle income and high income

The trend in Theil's index between these groups was seen as follows:

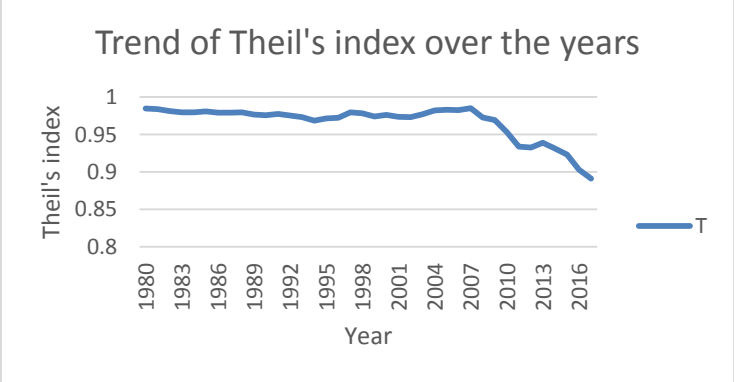


Fig:8

Thus, we can see that income inequality *between* the groups shows a downward trend, painting a rosy picture of the society. But on a closer look, we find that the income inequality *within* the middle class is rising substantially.

(We have calculated the Theil's index $T_{i\ for}$ middle income group by taking the population as that of the middle-income group and individuals as – lower middle, middle and upper middle-income earners.)

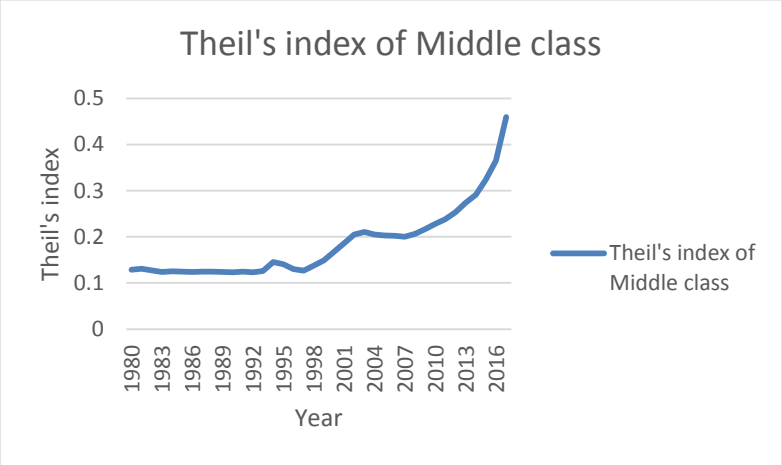


Fig 9

The rightward shift in the demand for skilled labour creates an increase in the relative wages of the skilled compared to unskilled workers. Hence, the income gap among workers also has widened. The upward trend of the above graph shows the rise in inequality of the middle class.

Section 4: Estimating employment elasticity of growth for the Indian economy

In this section we investigate the relationship between output growth and employment growth in the Indian economy .This paper also provides updated estimates on employment elasticity- aggregate as well as sector specific. The aggregate employment elasticity estimates for India have declined over the decades and vary from 0.18(arc elasticity) to 0.20(point elasticity). Sector wise, while agriculture has witnessed negative elasticity, manufacturing sector also witnessed the same result in the given accounting period. Mining, quarry and private service sector have also been employment intensive. Thus employment intensive growth is crucial for India to meet the demographic divide challenge.

Indian economy which has grown at an average rate of over 7% since year 2000 displays a skewed output employment structure. Services make up the largest share of output, while output is concentrated mostly in agriculture and largely informal in nature. Economic growth has provided prosperity for some as the gap between upper and lower class incomes has widened over time representing a growing social and political problem in the economy.

Against this backdrop, the paper aims to compute elasticities for the Indian economy more specifically for the 2000's using the latest available data.

Formal Employment and Output: Our paper stresses on the question whether the formal sector is generating enough employment as they are generally associated with higher pay, greater job security and better overall benefits. However the anomaly

between output and employment growth in India becomes obvious as we see the trend growth rate of output was a healthy 6.2% while formal employment was 0.2%.We refer to the figure below.

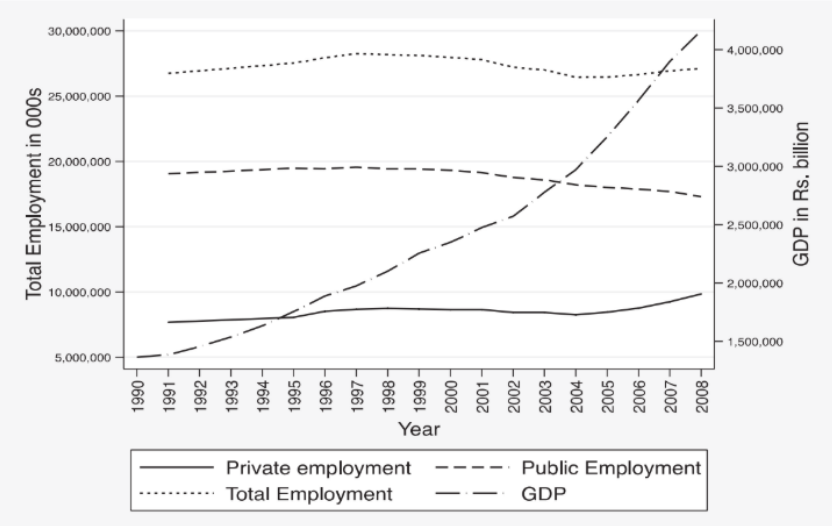


Fig 10

Employment elasticity of growth: It is defined as the percentage change in employment as a result of 1% increase in growth.

In empirical literature there have been 2 methods generally used for the calculation of employment elasticities. These are based on compound annual growth rate (CAGR approach) which gives the arc elasticities and regression approach which gives the point elasticities.

That is, $e=\frac{\frac{\Delta L}{L}}{\frac{\Delta Y}{Y}}$ ……(xi), where, "L" denotes labour and "Y" denotes GDP

In the following table, since we have showed employment and GDP data for every 5 years hence the CAGR approach has been used first to calculate the elasticity of sectors

GROWTH OF EMPLOYMENT

TABLE1							
SECTOR	72-73/77-78	77-78/83	83/87-88	87-88/93-94	93-94/99-2000	99-00/04-05	04-05/09-10
Primary Sector	1.78	1.56	0.28	2.16	0.05	1.4	-1.63
MiningQuarrying	4.36	7.14	5.34	1.69	-2.11	2.41	3
Manufacturing	5.43	3.08	4.66	0.05	1.62	5.06	-1.06
Construction	1.67	6.84	13.91	-0.11	6.38	8.18	11.29
Trade	6.4	2.87	3.96	3.62	6.28	4.01	1.1
Financing	6.84	7.68	1.41	5.24	5.28	9.62	5.77
Tertiary Sector	4.86	3.46	2.11	5.03	2.85	4.08	1.59
Total	2.61	2.19	1.53	2.39	1.04	2.81	0.22

Fig 11

GROWTH OF GDP

TABLE 2							
SECTOR	72-73/77-78	77-78/83	83/87-88	87-88/93-94	93-94/99-2000	99-00/04-05	04-05/09-10
Primary Sector	4.34	2.47	-0.03	4.67	3.31	1.56	3.1
Mining and quarryi	4.94	7.28	5.58	6.51	5.2	4.8	4.11
Manufacturing	4.83	5.06	4.62	5.15	6.9	6.46	9.5
Construction	4.57	1.34	4.3	5.26	6.36	9.17	9.23
Trade	6.02	4.53	5.65	5.54	9.29	7.87	9.07
Financing	4.39	6.23	8.77	9.28	7.78	6.71	12.3
Tertiary Sector	4.7	5.15	6.9	6.37	8.35	7.58	11.15

Fig 12

EMPLOYMENT ELASTICITY WITH RESPECT TO GDP

TABLE 3							
SECTOR	72-73/77-78	77-78/83	83/87-88	87-88/93-94	93-94/99-2000	99-00/04-05	04-05/09-10
PrimarySector	0.41	0.63	-9.10	0.46	0.02	0.9	-0.53
Mining	0.88	0.98	0.96	0.26	-0.41	0.5	0.73
Manufacturing	1.12	0.61	1.01	0.01	0.24	0.78	-0.11
Construction	0.37	5.09	3.23	-0.02	1	0.89	1.22
Trade	1.06	0.63	0.7	0.65	0.68	0.51	0.12
Financing	1.56	1.23	0.16	0.56	0.68	1.43	0.47
TertiarySector	1.03	0.67	0.31	0.79	0.34	0.54	0.14
Total	0.57	0.56	0.38	0.42	0.16	0.47	0.02

Source: data is collected from https://m.rbi.org.in//Scripts/PublicationsView. aspx?id=15763

Fig 13

The long-term trend of a decline in the rate of employment growth cannot be ignored. What is intriguing is that this growth has been accompanied by acceleration. The above tables show the growth of employment and output in the time period of 1972-1973 to 2009-2010.

Employment elasticity with respect to GDP has been calculated using CAGR approach for some key sectors in the third and last table. The declining trend of the ratio of employment growth to growth in value added has been clearly evident from the above tables.

We see that GDP was growing at 4.6% pa in 1972-1973 but employment growth was a meagre 2.4% .As GDP growth rose to 5%, employment growth declined and this declining trend is quite evident as it is clearly seen in the values of employment elasticity. In the period 2004-05/2009-10 GDP growth has increased to 9% and that for employment is as insignificant is 0.22%.

SECTION 5: Estimating a Log Linear Regression

An alternative way to calculate the elasticity is to estimate a log log regression model between employment and GDP. Note that this generates the point elasticity of employment. The conventional form of equation looks like

$$\text{Ln } L=\alpha+\beta \ln Y$$

Where "L" and "Y" denote Labour and GDP respectively and "ln" stands for natural logarithm. According to the

Model, the regression coefficient β gives us the employment elasticity.

$$\text{Ln } L=\alpha+\beta \ln Y \ldots\ldots\ldots\ldots \text{(xii)}$$

Taking differentials on both sides, $\frac{1}{L}\,dL=\beta\frac{1}{Y}\,dY$

Therefore, $\frac{\frac{dL}{L}}{\frac{dY}{Y}}=\frac{dln(L)}{dln(Y)}=e$……..(xiii)

International Labour Organizations like the (ILO) have estimated employment elasticities for different regions of the world. Several studies have been conducted to explain the cross-country variations in the employment elasticities. We present a cross country comparison in the following table for reference purpose.

	Employment elasticity				Average annual GDP growth rate			
	1992-96	1996-00	2000-04	2004-08	1992-96	1996-00	2000-04	2004-08
WORLD	0.3	0.4	0.3	0.3	3.1	3.7	3.3	4.4
Developed Economies & European Union	0.3	0.3	0.2	0.5	2.4	3.3	1.9	2.2
Central & South-Eastern Europe (non-EU)	0.2	0.2	0.2	0.2	-5.5	3.2	6.0	6.7
East Asia	0.1	0.2	0.1	0.1	10.2	7.0	7.8	9.3
South-East Asia & the Pacific	0.3	0.1	0.3	0.4	7.8	1.6	4.9	5.8
South Asia	0.3	0.4	0.4	0.3	6.0	5.4	5.5	8.4
Latin America & the Caribbean	0.6	0.9	0.8	0.5	3.3	3.0	2.3	5.0
Middle East	1.1	1.5	0.7	0.7	2.9	3.3	5.1	5.7
North Africa	0.8	0.6	0.8	0.7	2.3	4.3	4.3	5.6
Sub-Saharan Africa	0.7	0.7	0.5	0.5	2.9	3.0	6.0	6.1

Source: Employment Elasticities Indicator KILM 19 (2009), International Labour Organization (ILO)

Fig 14

While our paper does use the regression approach, we must mention beforehand that this approach is not very popular in India.

REGRESSION ANALYSIS

The following regression analysis is carried out based on time series data on labour input starting from 2001-2002 to 2010-2011.

EMPLOYMENT ELASTICITY BASED ON LOG-LOG REGRESSION	
SECTORS	LOG LOG OLS REGRESSION COEFFICIENTS
AGRICULTURE	-0.05
MINING AND QUARRYING	0.34*
MANUFACTURING	-0.33**
CONSTRUCTION	1.08**
SERVICES	0.47
ALL SECTORS	0.19*
*NOTE 1: * AND ** IMPLIES SIGNIFICANCE AT 5 PERCENT AND 1 PERCENT,RESPECTABLY.*	
SOURCE: DATA OF EMPLOYMENT AND GDP FROM data.gov.in(EMPLOYMENT AND UNEMPLOYMENT) AND THAT OF GROSS DOMESTIC PRODUCT https://data.gov.in/sites/default/files/datafile/GDP_and_Major_Industrial_Sectors_of_Economy_Data set.xls	
NOTE 2: GDP IS MEASURED IN CONSTANT PRICES (2004-05) AND MEASURED IN RS. CRORE.WHEREAS EMPLOYMENT IS IN THOUSANDS	

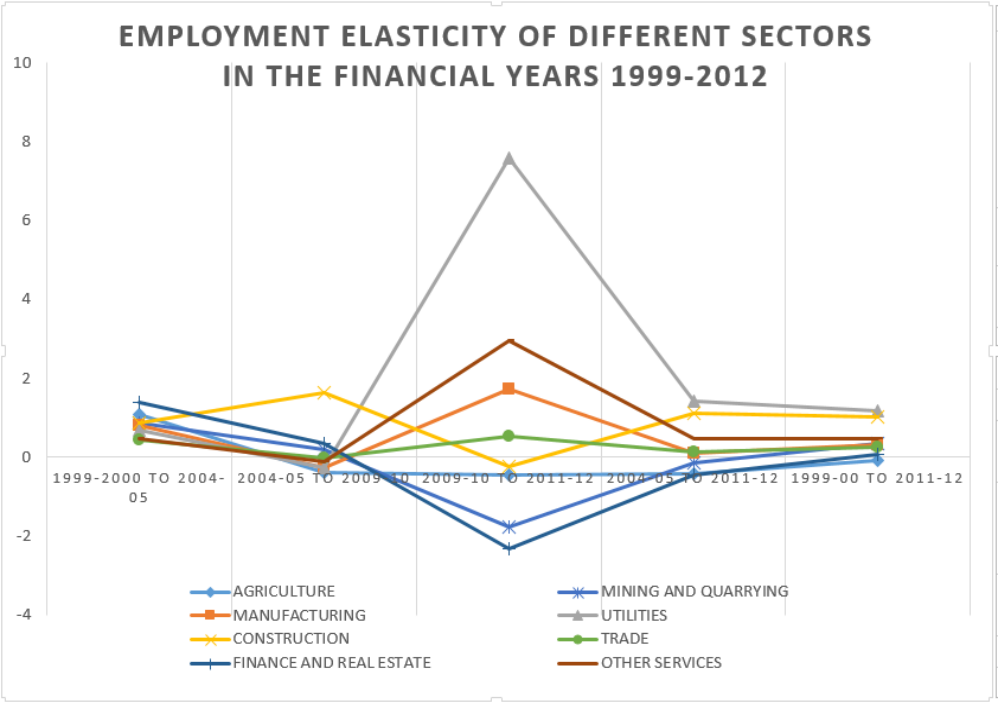
Fig 15

Refer to the Appendix for data (1,2,4,5,6,7,8,9)

Employment elasticity has been calculated by running a log-log regression of sectoral employment figures generated (dependant variable) and GDP (independent variable).

The analysis for the different sub sectors has been conducted for the period 2001-2002 to 2010-2011. The aggregate elasticity has been observed to be 0.19.

Accordingly the log-log OLS regression coefficient for the agricultural and manufacturing sectors has come out to be negative (-0.05and -0.33 respectively).There has been an established consensus that organized industrial sector growth has been jobless. Also for the agricultural sector the elasticity turns out to be negative, it is not statistically significant .It is in line with the general consensus that agricultural growth has not been employment intensive in India. Elasticity has been observed to be highest for construction followed by service sector and mining and quarrying. Manufacturing and construction and is observed to be highly statistically significant whereas service and agriculture is statistically insignificant.



Source: Sector wise classification as mentioned by planning commission. Data is provided in the appendix. (3)

Fig 16

Using the sector wise employment figures for the period of 1992-2000 the employment elasticity has been computed. As we have already said employment elasticity in India varies from 0.18(arc elasticity) to 0.2(point elasticity) during the post reform period elasticities do vary across sectors .Observing the sector wise, employment elasticities we witness that it is in the negative zone for the agriculture sector which results in a migration of labour into other sectors of the economy in search for gainful employment. Elasticity is significantly higher for utilities which generally comprises of electricity gas, water supply and waste management. In case of manufacture unlike 1990's that practically witnessed jobless growth, 2000's has been job creating, however the second half did witness some job losses.

SECTION 6: THE ROLE OF INFORMAL SECTOR:

The main aim of our paper was to focus on the shrinking organized sector and the rise of unorganized sector, a phenomenon which we have referred to as informalization of the economy. Over the years the unorganized sector has expanded rapidly in the context of Indian economy. In this section we have tried to measure the economic significance of the unorganized sector in Indian economy by its share, growth, and composition in comparison with the organized sector under liberal foreign policy regime. In this section we mainly focus on a comparative analysis between the organized and unorganized sector at aggregate level and for that net domestic product has been divided into organized and unorganized sector as given below. The estimates of factor incomes for the economy as a whole alongside its distribution by organized and unorganized sectors has been given below.

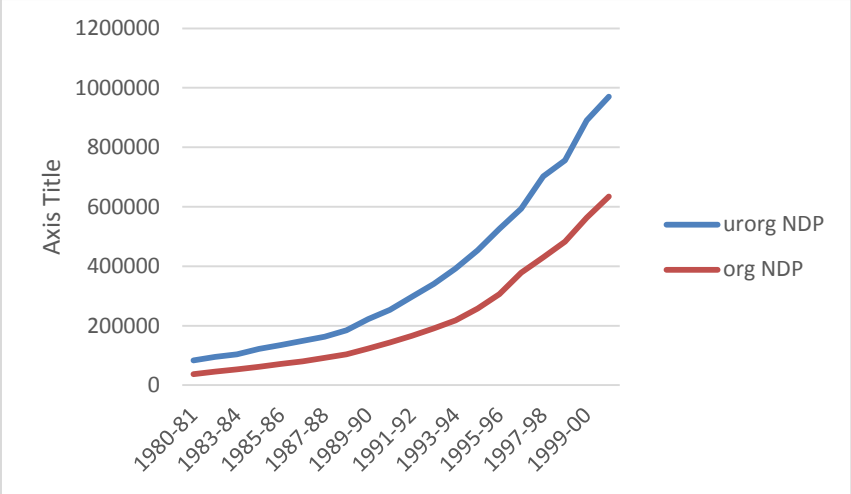
STATEMENT 1.1 : FACTOR INCOMES: SUMMARY RESULTS

	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
1. Net Domestic Product:Total	120784	141073	157032	184217	206297	229132	254746	288611	345156	396568
1.1 Comp. of employees	46516	53357	60468	70703	81794	90962	103439	119069	137458	158072
1.2 Operating surplus	9414	13381	15947	18504	20416	23152	26336	28218	36227	44272
1.3 Mixed Income	64855	74334	80617	95010	104086	115019	124971	141323	171471	194223
2. Net Domestic Product:Organised Sector	37477	45741	53442	62314	71406	79856	92045	104332	122838	143232
2.1 Comp. of employees	28063	32360	37495	43810	50990	56704	65709	76114	86611	98960
2.2 Operating surplus	9414	13381	15947	18504	20416	23152	26336	28218	36227	44272
2(A) Public Sector	20472	25436	31315	36976	42119	49013	58154	67571	80550	93380
2(A).1 Comp. of employees	18811	21626	25400	29726	34436	40090	45925	54493	62857	72810
2(A).2 Operating surplus	1661	3810	5915	7250	7682	8923	12229	13078	17693	20570
2(B) Private Organised Sector	17006	20305	22127	25338	29288	30843	33891	36761	42288	49852
2(B).1 Comp. of employees	9252	10734	12095	14084	16554	16614	19784	21621	23754	26150
2(B).2 Operating surplus	7753	9571	10032	11254	12734	14229	14107	15140	18534	23702
3. Net Domestic Product: Unorganised Sector	83307	95332	103590	121903	134890	149277	162701	184279	222317	253335
3.1 Comp. of employees	18452	20998	22973	26892	30804	34258	37729	42955	50847	59112
3.2 Mixed Income	64855	74334	80617	95010	104086	115019	124971	141323	171471	194223

	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
1. Net Domestic Product:Total	463954	532197	609389	711268	831417	972163	1132320	1258185	1453881	1605104
1.1 Comp. of employees	184554	209614	238565	258786	304187	366716	415307	479062	552596	622569
1.2 Operating surplus	51480	60766	68857	103289	131871	161368	188048	201189	230847	255853
1.3 Mixed Income	227921	261817	301967	349192	395358	444079	528965	577934	670438	726682
2. Net Domestic Product:Organised Sector	166108	191433	217404	257831	305840	378242	430243	482474	563696	634767
2.1 Comp. of employees	114628	130667	148548	154541	173968	216874	242195	281285	332848	378914
2.2 Operating surplus	51480	60766	68857	103289	131871	161368	188048	201189	230847	255853
2(A) Public Sector	105835	125983	143386	164453	191718	226628	245414	292533	337584	383305
2(A).1 Comp. of employees	81619	93084	106496	117223	132955	160340	181176	215672	261180	296636
2(A).2 Operating surplus	24217	32899	36890	47230	58763	66289	64238	76861	76404	86669
2(B) Private Organised Sector	60273	65450	74018	93378	114122	151613	184829	189941	226112	251462
2(B).1 Comp. of employees	33010	37583	42052	37318	41014	56534	61019	65613	71669	82278
2(B).2 Operating surplus	27263	27867	31967	56060	73109	95079	123810	124328	154443	169184
3. Net Domestic Product: Unorganised Sector	297846	340764	391984	453437	525577	593922	702076	775711	890185	970337
3.1 Comp. of employees	69925	78948	90018	104245	130219	149842	173112	197777	219747	243655
3.2 Mixed Income	227921	261817	301967	349192	395358	444079	528965	577934	670438	726682

Fig 17

The trends of organized and unorganized sector NDP is shown in the following figure



Source: National Accounts Statistics 2008:The central statistical organization Department of Statistics. Factor incomes base year 1999-2000

Fig 18

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	11.14359	0.018557	600.504	3.57E-40	11.10461	11.18258	11.10461	11.18258
X Variable 1	0.133248	0.001549	86.01572	5.42E-25	0.129994	0.136503	0.129994	0.136503

By estimating the above equation for the unorganized sector we get the following results. The positive and statistically significant coefficients of regression reflect a definite and significant increase in unorganized sector with the passage of time. From the above estimate we see that the growth rate of unorganized sector is given by estimated 'b'.

The contribution of organized and unorganized sector's NDP can be described by percentage share in total NDP and presented in the following figure. It is evident that unorganized sector has the maximum share.

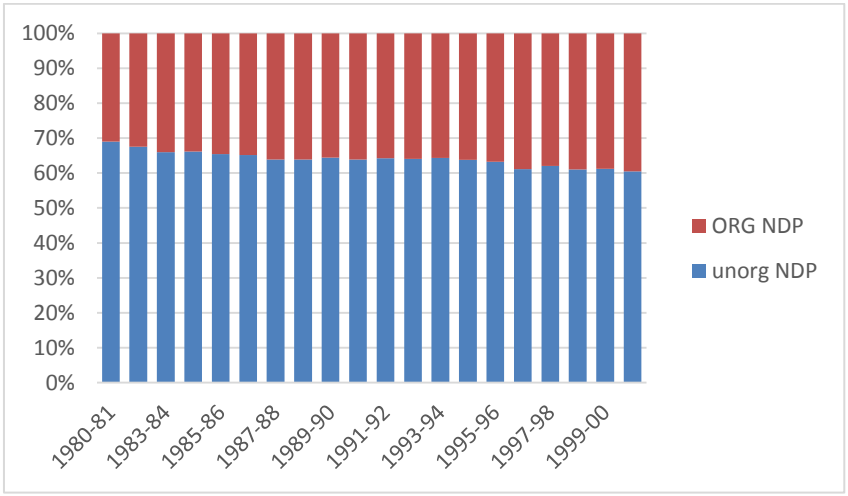


Fig 19

Hence we conclude by saying that growth unorganized sector overall has an increasing trend at an aggregate level post liberalization which is also in tandem with the theoretical finding of our paper which stresses on the 'informalization ' of the economy.

SECTION 7: CONCLUSION

Lastly, we would like to say that although our prime motive is to investigate the intrinsic underlying currents triggering jobless growth, we have made significant references to stark increases in wage inequality in our structurally changed economy. This is so because jobless growth and income inequality always go in tandem and their mutual association invalidates the idea of treating them as independent identities.

The problem of wage gap and inequality assumes significance since the wages of the skilled labourers increase while the unskilled labourers are forced to work in the informal sector at a subsistence wage. Hence, we conclude that the idea of a segmented labour market is extremely relevant, and we bring this aspect into the standard model of trade to explain jobless growth and the rise of the informal sector. Hence our paper throws light on the impact of trade and liberalization on organized sector employment. Though this analysis does not address how trade affects the informal sector which provides a significant proportion of the total employment in developing countries, it helps to analyze how trade might displace labour from the organized sector and push them into the insecure informal markets. The model theoretic framework presented in our paper confirms that tariff liberalization and inflow of voluminous amounts of foreign capital in the form of FDI sets the stage for an upward drift to wage inequality which ultimately culminates in the form of accelerating joblessness, and this has proven to be true especially in developing countries like India characterized by high growth rates under the penumbra of acute inequality and obnoxious poverty. Thus, we can say that This increased access to world markets does not manifest into overall economic growth when one takes income inequality into consideration. Increased trade liberalization may reduce overall inequality but drastically increases inequality within the middle class. All these effects have been shown to be significant in our Statistical Analysis in the following sections. Our paper has provided estimates for employment elasticity in India in the aggregate level as well as for broad sectors through different approaches. We can further compute employment elasticities at greater disaggregation- state wise and sector wise estimates which could be a further extension of the paper.

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APPENDIX:

(1)

	TOTAL GDP(AT CONSTANT PRICES 2004-05)in Rs crore	EMPLOYMENT ACROSS VARIOUS SECTORS(in thousands)				
FINANCIAL YEAR	TOTAL GDP(AT CONSTANT PRICES)	AGRI	MININING AND QUARRYING	(MANUFACTURING)	SERVICE SECTOR	CONSTRUCTION
2001-02	24,72,052	483	861	1,350	8,432	56
2002-03	25,70,690	506	847	1,260	8,421	44
2003-04	27,77,813	490	1,030	1,190	8,250	50
2004-05	29,71,464	500	1,010	1,130	8,450	50
2005-06	32,53,073	470	1,150	1,090	8,810	50
2006-07	35,64,364	470	1,140	1,090	9,270	70
2007-08	38,96,636	470	1,120	1,040	9,840	70
2008-09	41,58,676	480	1,110	1,060	10,380	80
2009-10	45,16,071	480	1,100	1,070	10,850	90
2010-11	49,37,006	480	1,090	1,020	11,450	100

(2)

FINANCIAL YEARS	LN(GDP)	LN(AGRI)	LN(MINING AND QUARRYING)	LN(MANUFACTURING)	LN(SERVICES)	LN(CONSTUCTION
2001-02	14.72055912	6.180016654	6.758094504	7.207859871	9.039789271	4.025351691
2002-03	14.75968484	6.226536669	6.741700695	7.138867	9.038483865	3.784189634
2003-04	14.83717452	6.194405391	6.937314081	7.081708586	9.017968479	3.912023005
2004-05	14.90456532	6.214608098	6.91770561	7.029972912	9.04192172	3.912023005
2005-06	14.99511064	6.152732695	7.047517221	6.993932975	9.083642719	3.912023005
2006-07	15.08649615	6.152732695	7.038783541	6.993932975	9.134538659	4.248495242
2007-08	15.17562428	6.152732695	7.021083964	6.946975992	9.19421099	4.248495242
2008-09	15.2407073	6.173786104	7.012115294	6.966024187	9.247636157	4.382026635
2009-10	15.32315293	6.173786104	7.003065459	6.975413927	9.291920359	4.49980967
2010-11	15.41226963	6.173786104	6.993932975	6.927557906	9.345745009	4.605170186
	LOG LOG COEFF:	-0.05	0.345288775	-0.336317605	0.47783051	1.08

(3)

FINANCIAL YEAR	AGRICULTURE	MANUFACTURING	MINING AND QUARRYING	UTILITIES	CONSTRUCTION	TRADE	FINANCE AND REAL ESTATE	OTHER SERVICES
1999-2000 to 2004-05	1.09	0.8	0.87	0.67	0.88	0.45	1.4	0.46
2004-05 to 2009-10	-0.39	-0.27	0.2	-0.27	1.63	-0.02	0.34	-0.11
2009-10 to 2011-12	-0.44	1.74	-1.76	7.6	-0.25	0.54	-2.32	2.96
2004-05 to 2011-12	-0.41	0.1	-0.14	1.42	1.12	0.13	-0.45	0.48
1999-00 to 2011-12	-0.08	0.33	0.34	1.17	1.01	0.25	0.06	0.47

(4)

			TOTAL ELASTICITY	0.1986572						
SUMMARY OUTPUT										
Regression Statistics										
Multiple R	0.859515006									
R Square	0.738766046									
Adjusted R Square	0.706111802									
Standard Error	0.017278313									
Observations	10									
ANOVA										
	df	*SS*	*MS*	*F*	*ignificance F*					
Regression	1	0.006754138	0.006754138	22.62389051	0.001433					
Residual	8	0.002388321	0.00029854							
Total	9	0.009142459								
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*	*Upper 95.0%*	
Intercept	8.508381994	0.360056033	23.63071639	1.09436E-08	7.678091	9.338673	7.678091	9.338673	9.731158244	
log (GDP)	0.198657246	0.023928334	4.756457769	0.001433307	0.058635	0.168993	0.058635	0.168993	0.167928749	

(5)

SUMMARY OUTPUT		CONSTRUCTION						
Regression Statistics								
Multiple R	0.923134488							
R Square	0.852177283							
Adjusted R Squar	0.833699443							
Standard Error	0.115499377							
Observations	10							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.615230756	0.615230756	46.11888068	0.000139082			
Residual	8	0.106720848	0.013340106					
Total	9	0.721951604						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-12.19026458	2.406846537	-5.064828353	0.000971215	-17.74046265	-6.640066516	-17.74046265	-6.640066516
LN(GDP)	1.086250897	0.159952403	6.791088328	0.000139082	0.717399994	1.4551018	0.717399994	1.4551018

(6)

SUMMARY OUTPUT								
			AGRICULTURE					
Regression Statistics								
Multiple R	0.525698							
R Square	0.276358							
Adjusted R	0.185903							
Standard E	0.023131							
Observatic	10							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regressior	1	0.001635	0.001635	3.055195	0.118609			
Residual	8	0.00428	0.000535					
Total	9	0.005915						
	Coefficients	*andard Erı*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	7.010234	0.475321	14.74841	4.39E-07	5.914141	8.106326	5.914141	8.106326
LN(GDP)	-0.05494	0.031431	-1.74791	0.118609	-0.12742	0.017542	-0.12742	0.017542

(7)

SUMMARY OUTPUT								
			MINING					
Regression Statistics								
Multiple R	0.764921							
R Square	0.585105							
Adjusted R	0.533243							
Standard E	0.076345							
Observatic	10							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regressior	1	0.065758	0.065758	11.28197	0.009949			
Residual	8	0.046629	0.005829					
Total	9	0.112387						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	1.678211	1.568847	1.06971	0.31596	-1.93956	5.295979	-1.93956	5.295979
LN(GDP)	0.348457	0.103742	3.358864	0.009949	0.109226	0.587687	0.109226	0.587687

(8)

SUMMARY OUTPUT								
			MANUFACTURE					
Regression Statistics								
Multiple R	0.914181							
R Square	0.835727							
Adjusted R	0.815193							
Standard E	0.038738							
Observatic	10							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regressior	1	0.061074	0.061074	40.69937	0.000214			
Residual	8	0.012005	0.001501					
Total	9	0.073079						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	12.10401	0.796035	15.20537	3.47E-07	10.26835	13.93967	10.26835	13.93967
LN(GDP)	-0.33582	0.052639	-6.37961	0.000214	-0.4572	-0.21443	-0.4572	-0.21443

(9)

SUMMARY OUTPUT	SERVICES							
	Regression Statistics							
Multiple R	0.966113684							
R Square	0.933375651							
Adjusted R Square	0.925047607							
Standard Error	0.032633082							
Observations	10							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	1	0.119352	0.119351986	112.0762193	5.54E-06			
Residual	8	0.008519	0.001064918					
Total	9	0.127871						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	3.171783373	0.564185	5.621887726	0.000497402	1.870771	4.472796	1.870771	4.472796
X Variable 1	0.41379438	0.039087	10.58660566	0.567849647	0.323661	0.503928	0.323661	0.503928

APPENDIX

Calculation of Theil's Index within middle class

Year	Lower middle class	Middle class	Upper middle class	μ
1980	12945.35526	24089.74561	47354.2653	28129.79
1981	12900.12568	24398.31002	47856.1303	28384.86
1982	13145.00155	24732.6126	48002.3265	28626.65
1983	13589.5641	24689.14563	48175.00126	28817.9
1984	13689.58423	24578.54615	48563.2585	28943.8
1985	13847.12335	24716.64643	48915.3256	29159.7
1986	14198.56463	24978.6463	49632.1452	29603.12
1987	14125.6465	25198.64946	49810.2356	29711.51
1988	14032.54631	25314.6498	49796.1254	29714.44
1989	13965.4523	25631.3265	49732.15687	29776.31
1990	14112.46313	25812.6562	49968.1266	29964.42
1991	14009.3155	25964.21565	50213.65632	30062.4
1992	14102.32655	26589.35158	50421.46324	30371.05
1993	14099.652	28569.32584	52352.8793	31673.95
1994	14087.165	30950.5842	58993.48313	34677.08
1995	13921.1654	32645.25212	58213.49623	34926.64
1996	13905.3545	31320.3586	54469.98463	33231.9
1997	13954.1556	34689.35105	55264.57632	34636.03
1998	13895.5851	35651.35971	58789.64623	36112.2
1999	12997.2822	38698.6511	60494.64631	37396.86
2000	12564.5851	41254.36582	66412.97862	40077.31
2001	11983.267	40352.21544	70123.46233	40819.65
2002	11698.65496	43489.2541	77542.64632	44243.52
2003	11569.1542	44987.35712	80001.65632	45519.39
2004	11567.65633	48596.35712	79856.65463	46673.56
2005	11598.6533	50268.68422	79996.54631	47287.96
2006	11523.54121	52469.2842	80215.97632	48069.6
2007	11548.4596	55369.51214	80012.3532	48976.77
2008	11496.1648	60796.3511	84484.56463	52259.03
2009	11458.2154	64655.697	91234.76313	55782.89

Year	Lower middle class	Middle class	Upper middle class	μ
2010	11501.2365	68924.26842	99657.65613	60027.72
2011	11495.3264	80682.2597	110654.5465	67610.71
2012	11462.3254	81654.25415	-265639.5744	34360.43
2013	11402.3265	81256.316	-265791.9826	34208.02
2014	11395.12596	82142.56322	-265500.2488	34499.75
2015	11371.359	85632.65462	179483.5463	92162.52
2016	11375.1235	85998.65316	214532.3217	103968.7
2017	11356.3569	87612.6659	286431.2453	128466.8

Lower middle		Middle		Upper middle		
xi/μ	ln(xi/μ)	xi/μ	ln(xi/μ)	xi/μ	ln(xi/μ)	Ti
0.460200942	-0.77609206	0.856378476	-0.15504	1.683421	0.520828	0.128946
0.454472131	-0.78861869	0.859553791	-0.15134	1.685974	0.522343	0.130722
0.459187609	-0.77829642	0.863971694	-0.14622	1.676841	0.516911	0.127689
0.471566713	-0.7516947	0.856729411	-0.15463	1.671704	0.513843	0.124014
0.472971275	-0.74872062	0.849181838	-0.16348	1.677847	0.517511	0.125119
0.474871966	-0.74471006	0.847630385	-0.16531	1.677498	0.517303	0.12467
0.479630703	-0.73473884	0.843784283	-0.16986	1.676585	0.516759	0.123554
0.475426737	-0.74354248	0.848110682	-0.16474	1.676463	0.516686	0.124328
0.472246695	-0.75025377	0.851930892	-0.16025	1.675822	0.516304	0.124802
0.469012158	-0.75712659	0.860795877	-0.1499	1.670192	0.512939	0.124191
0.470974087	-0.7529522	0.86144368	-0.14915	1.667582	0.511375	0.123219
0.466007952	-0.76355258	0.863677526	-0.14656	1.670315	0.513012	0.124831
0.464334552	-0.76714997	0.875483531	-0.13298	1.660182	0.506927	0.122985
0.445149751	-0.80934454	0.901981713	-0.10316	1.652869	0.502512	0.125753
0.406238531	-0.90081478	0.892537275	-0.11369	1.701224	0.531348	0.145509
0.398583037	-0.91983943	0.934680635	-0.06755	1.666736	0.510867	0.14057
0.418433939	-0.87123625	0.942478742	-0.05924	1.639087	0.49414	0.12985
0.402879791	-0.90911705	1.001539535	0.001538	1.595581	0.467238	0.12693
0.384789247	-0.9550595	0.987238735	-0.01284	1.627972	0.487335	0.137731
0.347550095	-1.05684647	1.034810175	0.034218	1.61764	0.480968	0.148712

Lower middle		Middle		Upper middle		
xi/μ	**ln(xi/μ)**	**xi/μ**	**ln(xi/μ)**	**xi/μ**	**ln(xi/μ)**	**Ti**
0.313508695	-1.15992818	1.029369635	0.028947	1.657122	0.505082	0.167711
0.29356615	-1.22565228	0.988548828	-0.01152	1.717885	0.541094	0.186114
0.264415114	-1.33023501	0.982951981	-0.0172	1.752633	0.561119	0.204933
0.254158819	-1.36979594	0.988311968	-0.01176	1.757529	0.563909	0.21044
0.247841761	-1.3949648	1.041196799	0.040371	1.710961	0.537055	0.205062
0.245277085	-1.40536675	1.063033442	0.061127	1.691689	0.525728	0.203214
0.239726169	-1.42825797	1.09152736	0.087578	1.668746	0.512073	0.202574
0.235794611	-1.44479415	1.13052589	0.122683	1.633679	0.490835	0.199963
0.219984288	-1.51419915	1.163365542	0.151317	1.61665	0.480356	0.206502
0.205407339	-1.58276025	1.159059612	0.147609	1.635533	0.491969	0.216869
0.191598755	-1.65235191	1.148207329	0.138202	1.660194	0.506934	0.227902
0.170022268	-1.77182586	1.193335474	0.176752	1.636642	0.492647	0.238654
0.333590903	-1.09783988	2.376404039	0.865588	0.290005	-1.23786	0.128946
0.33332322	-1.09864263	2.375358827	0.865149	0.291318	-1.23334	0.128946
0.330295888	-1.10776639	2.380961034	0.867504	0.288743	-1.24222	0.128946
0.123383768	-2.09245571	0.929148364	-0.07349	1.947468	0.66653	0.323863
0.109409116	-2.21266107	0.827159074	-0.18976	2.063432	0.724371	0.365215
0.088399188	-2.4258925	0.681987065	-0.38274	2.229614	0.801828	0.460065

Competitive Balance and Uncertainty of Outcome Hypothesis- A Revolution in Sports Economics

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Introduction

Simon Rottenberg, an economist at the University of Chicago is widely regarded as the founder of sports economic research. The first ever professional journal article in sports economics was published by him in the year 1956 called, "The Baseball Players' Labour Market". The central theme of the paper was the concept of competitive balance in sports. In his own words:

> *"The nature of the [sports] industry is such that competitors must be of approximately equal "size" if any are to be successful; this seems to be a unique attribute of professional competitive sports."*
>
> Simon Rottenberg, 1956

He believed that no professional sports team would be successful if its competitors do not prosper sufficiently; in essence, the difference in quality of the competitor is not too dissimilar to it.

He hypothesised that matches with uncertain outcomes is more likely to be watched by fans. This would create more demand for the sporting industry, which means that unlike other industries, competition creates a better market for the sports' teams. There is no sports without competition and closer the competition, the more the demand for professional sports. This is the concept of **Competitive Balance** and the above hypothesis is called the **Uncertainty of Outcome Hypothesis**.

He also provided the **Invariance Principle** which stated that player talent in a league would go to the team that valued that talent the most, invariant of team revenues.

The concept of competitive balance has been subject to enormous research since Rottenberg's paper and several attempts have been made to manage competitive balance in different leagues.

Competitive Balance

The concept of competitive balance is fairly straightforward - an entirely predictable outcome in any sports contest would lead to a lack of interest from potential spectators, sporting is an entertainment industry after all. A better competitive balance means more match attendance, television money and further growth of the sport.

Competitive balance is often the justification given for several interventions introduced by different sports' administration bodies; these could be salary caps, transfer regulations, fixed budget and selling TV rights.

However, it's not as straightforward as it sounds. There is ample research to suggest that in various situations competitive imbalance is preferred, what if fans favour some teams over others? Stefan Szymansky's paper, "Competitive Balance in sports leagues and paradox of power (2006)" proves a paradox, according to him, "In a standard logit contest model, the strong do not win enough, i.e. more wins by the strong would

increase attendance or revenues". He further states that this will only be true so long as the strong don't become too dominant, this kills all unpredictability and eventually interest.

So there is more than enough substance in Competitive Balance theory, which has led to the development of various models for its measurement.

Measuring Competitive Balance

The 2015-16 English Premier League season saw Leicester City win the title. The team narrowly avoided relegation in the year before and betting companies were offering 5000-1 odds on them winning the league. This extraordinary feat did come with its perks, from Aug 2015 to Apr 2016, the club's social media growth in the number of followers went up 736,554 to 4,556,411; a 518.61% increase.

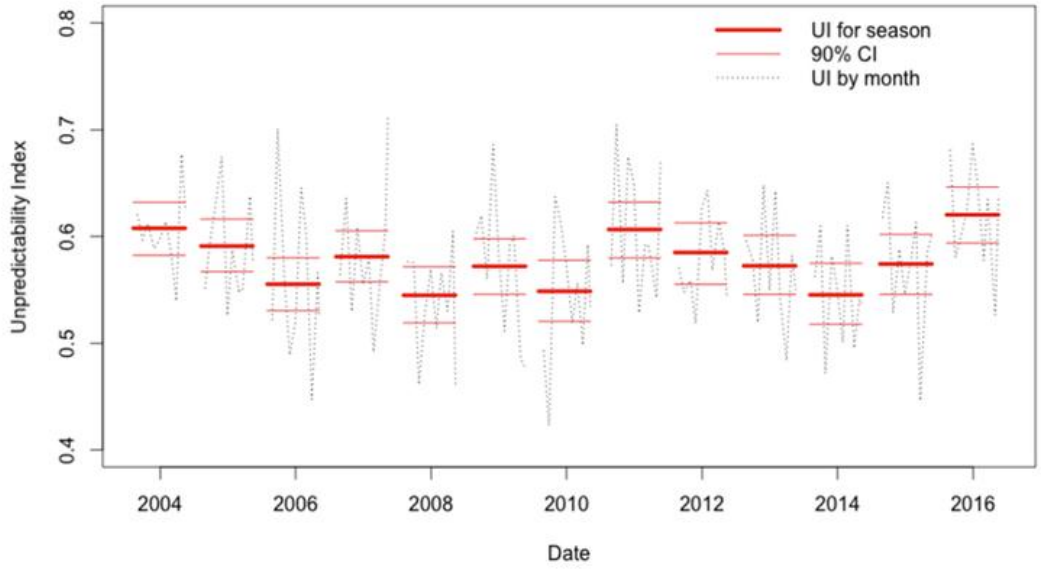
Everyone loves an underdog story, but how unprecedented was this feat? In the 25 years since the Premier League started, before that, only 5 teams ever won the title; this meant that such a performance from a team that was in the second division a couple seasons ago was highly unlikely.

In an article by Ian Mchale, Professor of Sports Analytics at the University of Salford, he uses one of the models to measure the unpredictability of the Premier League as compared to the past 10 years as well as to other big leagues across Europe.

The details of the unpredictability index was as follows,

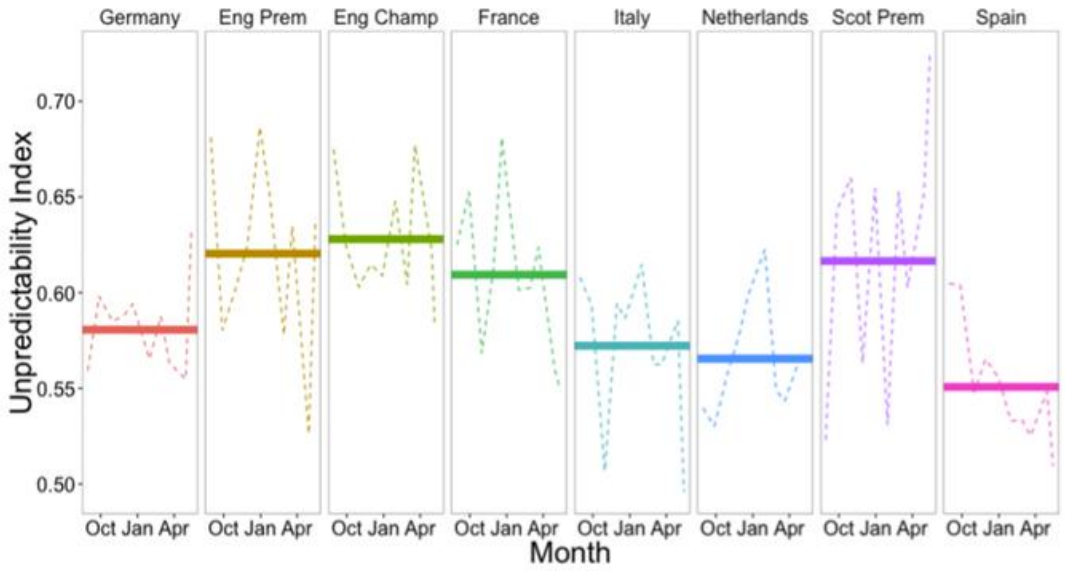
The unpredictability index for a match is given by $(H\text{-}pH)^2 + (D\text{-}pD)^2 + (A\text{-}pA)^2$ where H stands for home win, D stands for draw and A stands for away win. H is 1 if the match result is a home win, or 0 otherwise and pH is the probability of a home win. Similarly, D=1 if the match is a draw, and A=1 if the match is an away win, with pD and pA being the probabilities of a draw and away win respectively.

The probabilities were taken from historical bookmakers' odds, essentially measuring how good the bookmakers' predictions were.



Source: Ian Mchale, Professor of Sports Analytics, University of Salford

As it is quite clear from the above graph. The 2015/16 season was the most unpredictable since 2004 but if a 90% confidence level is considered, it is not too dissimilar to the previous seasons, as Mchale points out, and, there wasn't a fundamental shift in the predictability in the league. Apart from Leicester, most of the others did quite close to their true level and there wasn't much discrepancy in that regard.



Source: Ian Mchale, Professor of Sports Analytics, University of Salford

He also compared the unpredictability of the league with other leagues in Europe which shows that the English second division called the Championship was the most unpredictable league out of these, while the Premier League was in fact the most unpredictable top division league of the lot with Spain being the least predictable. This revelation partly proves the Competitive balance theory as the Premier League is the most popular league of the above making $5.3 billion in revenue while the second on the list - the German Bundesliga, only makes $2.8 billion. But there is more to the story, almost as unpredictable - the Scottish Premiership only makes a revenue of about $200 million. This is mainly down to the relative lack of quality of Scottish Football on an international stage, which means it was a bit unfair to compare the Scottish league to the other leagues mentioned above.

There are many other measures of competitive balance. Few of them include,

1) Number of Championships won introduced by Rottenberg (1956)
2) Top k ranking
3) Surprise Index introduced by Groot and Groot (2003)
4) Winning percentages are measured and various tools of statistics such as range, standard deviations and Gini Coefficient are used to calculate winning percentages.
5) Gini Coefficient and Lorenz Curve introduced by Quirk and Fort (1992,1997)
6) Strength difference by Ordered Probit Model introduced by Koning (2000)

7) Hirfindahl-Hirschman Index (HHI)
8) Entropy used by Horowitz (1997)
9) National Measure of Seasonal Imbalance (NAMSI) introduced by Goosens (2006)

The National Measure of Seasonal Imbalance (NAMSI) is a widely used measure which compares the observed standard deviations of winning percentages with the standard deviation of a completely unbalanced league.

We propose the NAtional Measure of Seasonal Imbalance (NAMSI):

$$\text{NAMSI} = \frac{sd_{season}}{sd_{certty}} = \frac{\sqrt{\frac{\sum_{i=1}^{n}(winperc_i - 0,5)^2}{n}}}{\sqrt{\frac{\sum_{i=1}^{n}(certwinperc_i - 0,5)^2}{n}}}$$ [30]

With i = team; n = total nr of teams; winperc = win percentage of team i; certwinperc = win percentage of a team when there is complete certainty[31]

Source: Goosens (2006)

In a publication on his blog *Boyd Nation*, a Mississippi State University graduate calculated predictability across different sports, including baseball, basketball, American football, and ice hockey.

For this he uses ISR measures which are indicators of quality of teams, he calculates the range of ISR, competitive balance using a correlational measure of the ISRs of the last 5 years and he uses the ISR ranks of the champions of the five years to ascertain which sports permits more off beat champions.

He finds out that baseball is the most competitive sport of the above, which isn't too much of a surprise as there have been 7 different Champions in the last 10 seasons of Major League Baseball, while Ice Hockey is the least competitive with 5 teams sharing the winner's trophy in the last 10 seasons.

With the sheer number of different measures of competitive balance in sports it is often a challenge to find out which one is the most accurate. However, it is quite clear that it is very important to keep it at some optimum level such that revenue and audience involvement is maximised.

Aaron Clauset, a computer science professor at the University of Colorado, analysed 40000+ games from the last decade across different games like college football, pro football, pro hockey and pro basketball. He believed that data analysis of sports statistics looks at numbers about players or teams that often have little relevance to the game's outcomes. He found through his study that scoring rhythms remained stable throughout these kind of games. He found that there is little correlation between one point and another, and that momentum doesn't exist - just a random sequence of events occurs. Which means that the games are more balanced than it appears, he believes that the events during a game is more random and less unfair, victories are

often decided by a stroke of luck or a ball falling your way, thus, improving competitive balance and making the sports more entertaining.

Sports Policy

Sports Associations all around the world manage different leagues in their own best way. Some are draft/auction based leagues while others allow clubs to spend what they earn or raise. The policy decisions taken by these associations - such as salary caps, transfer restrictions, selling broadcasting packages, and forming new leagues - are often made keeping competitive balance in mind. Each of these come with their own advantages and caveats as well as opposition from some teams.

1) Salary Caps- Salary caps were introduced by the National Basketball Association (NBA) as well as in other professional sports league in the US like the NFL and the NHL. The premise of salary caps is that it limits the amount a team can spend on players' salaries. It has shown mixed results. While it seems that competitive balance in the NBA has fallen after the salary caps as shown by Owens and Totty (2011) it seems to have had the desired effect in the NHL as shown by Lipasti (2015). This is because of the difference in the format of the two different leagues as the NBA is quite different in its setup from the NHL.
2) Transfer Restrictions- Transfer regulations are seen primarily in non-draft leagues which is mostly prevalent in European football. The Union of European Football Association (UEFA) manages transfer restrictions in Europe. In September 2009, UEFA approved the concept of 'Financial Fair Play'(FFP), with its objectives being, "to introduce more discipline and rationality in club football finances, to encourage clubs to compete within their revenues, and to protect the long-term viability of European club football." The FFP regulations require clubs entering UEFA competitions to pay off their obligations in a timely manner and live within their revenues (the 'break-even rule') by establishing a maximum deficit amount for relevant expenses over relevant income for a monitoring period. Any violation of the FFP regulations often leads to transfer bans for the teams. Grabar and Sonin (2018) in their recent column, show that these kinds of regulations have been able to show results by creating a more level playing field.
3) Broadcasting Packages- Recent court judgement in the UK Restrictive Practices Court about the premier league broadcasting case saw the court deciding that selling the rights collectively as a league is in public interest rather than selling them individually. Similar cases can be seen in the US and other parts of Europe. This promotes financial equality as the TV money received is equitably distributed among the teams and thus promote competitive balance.
4) New Leagues- According to a recent paper by E Woodrow Eckard (2015), he pointed out that if the competitive balance in a league is low, the stronger teams tend to leave the league and create another or join another league that is more balanced. This can be seen from the evidence of European football again where leagues in a country are divided into divisions where the top teams at the end of each season move up a division and the last placed teams move down.

Conclusion

Stan Kroenke, the owner of Arsenal Football Club in England is famous for his quote, “Economics is about creating win-win situations, but in sports, someone loses”.

Since Rottenberg first looked at sports economics in 1956, we have come a long way - there is more money in sports, there is a worldwide interest and for many fans it’s a religion. Data is collected in real time as the games are played, sports analytics has become more important than ever before, used for strategy as well as for research, and yet one of the most fascinating aspects of it still remains competitive balance and the Uncertainty of Outcome Hypothesis. The thrill of the game is in its unpredictability - who knew such a simple statement could be breeding ground for so much research. And as is said during many sporting events, this is true for Sports Economics too, “We’re just getting started!”

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DR. SUBRAMNIAN SWAMY

MEMBER OF PARLIAMENT, RAJYA SABHA | STATISTICIAN AND ECONOMIST | PREVIOUSLY TAUGHT AT HARVARD UNIVERSITY AND IIT DELHI |

Q.1 Going back to your undergrad and post-grad experience in India, what are some of the fondest memories that you cherish?

My undergraduate was from Delhi University, Hindu College in Mathematics and the subsidiary was Economics. I also took Political Science (third subsidiary). I did very well in Mathematics. Then I went for an examination in an institute called Indian Statistical Institute, where I got my Master's degree. Then I went to Harvard. Harvard gave me a scholarship for work I had done (demolishing the Mahalanobis fractile accuracy) in publishing a paper when I was just a graduate student. Harvard was impressed. The secret to getting into Harvard is not just showing yourself in good grades, because everybody has good grades. They're very suspicious of grades from India. But if you show some writing, some research, they consider you. So I got a full scholarship.

Then I went in and I took the toughest course those days which was this course given in Mathematics by Paul Samuelson. With MIT, a student from Harvard could cross-register. He didn't use to take more than 15-20 students in that class. And because I had got this mathematical training, I was in. For the rest of the students, you know, mathematics was just starting to come into Economics at that time, I'm talking about 1962. I was correcting him in class. And I must say, this is the difference between Indian teachers and American teachers. In India, they would have flunked me and thrown me out, saying 'How dare you?'. They don't encourage people to question. Thereafter, I joined the faculty and taught there. First, I became an assistant professor, then associate professor and then came back to India. But the people in power at that time wouldn't let me teach. I was a professor at IIT and IIT students knew Mathematics, they all loved my course.

Mrs. Gandhi, one day, sacked me and I couldn't find a job anywhere in India. So, either I had to go back to Harvard, which is what Samuelson and Kuznets said. But I said no, I'm not leaving India. Thereafter, I went into Politics. Not only they sacked me, but they also made my wife's life difficult. She was, at that time, teaching in the Mathematics department. So we decided, my wife goes into law and I go to Politics.

But I did go, off and on, whenever I could to Harvard to teach one course. After Mrs. Gandhi was assassinated, we all lost. So during that time, I went back to Harvard to teach for two years. Then from 2000, I went every year for summer school to teach two courses. So my academic teaching stopped in 2012.

Q.2 Sir, what factors do you think have primarily led to the slowdown that the Indian economy is experiencing right now?

I think two things, one is, our fiscal instruments all discourage demand. There is tax terrorism. People are harassed. Today, we are suffering from the demand for salvation. And a relative oversupply. People are not even putting money in banks. Banks don't have money. Previously, they used to lend against deposits and if you put out one rupee in deposit, they would lend eight rupees. They would create 8 accounts of one rupee each. So, all that is gone. And so the banks are now in starvation. And any of them can collapse anytime. PMC just now has. But it could happen to Punjab National

Bank, ICICI and so on. So the demand is one that needs to be addressed and is not being addressed.

Second is the way to generate growth for India is not '*more capital and more labor*'. It is innovation. And innovation always has been the driver of economic change. The locomotives came to Britain. That brought about the Industrial Revolution. Then the Americans brought in electricity, they brought in bulbs, telephones, then jet engines, fax machines and finally the internet. So these have made a huge difference. I mean, the internet has really reduced the inventory cost of almost every company. You take even a bookseller, now he knows which book is down to last book or last two copies. So innovation motivates young people, and we have got a lot of young people, we've got 70% of our population below the age of 35. The average age works out to only 26, whereas the average age of Americans is 37, of Europeans, is 46 and Japanese is 50. Even China because of its One Child Policy is at 35. An aging population means fewer people would be coming into the labor force and more people will be living longer, so you'll have to pay for their social security, pensions and so on.

So innovation is the most important thing. We know how the law of diminishing returns works. After innovation, you jump from curve to curve. For the same capital and labor, you get higher output. So if you look at the work done on innovation's contribution to economic growth, it's called factor productivity, total factor productivity. It's varied. For the Americans, it's 65% and the Japanese, it's 50%, for us, it's running at 30%.

Q.3 Innovation in which field?

Crude oil. We use it for petrol. I'm saying, you have something that's a drag on your economy, okay. So you find a substitute for it from within your country. You don't have oil, but you have hydrogen fuel cells which you just plug-in and it gets charged. I don't think electric cars will last very long. It will be taken over by all over the world. They're doing the research, the Japanese are about to introduce Toyota models with hydrogen fuel cells, which overnight you charge and travel 350 km the next day. And you'll have, instead of petrol pumps, charging stations. So that makes a huge difference.

For India, we can be converting 60% of the world's Thorium which we have into reactor fuel. You would be able to produce so much electricity that you will be able to give it away free. Qatar gives gas-free. Anywhere they poke a hole, gas comes out. So those are the kind of innovations we need. After all, what is software? Software is innovation. So those are things which raise your productivity. So that's why I'm saying instead of going along the curve, we should focus on going from curve to curve.

Q.4 You've been of the view that income tax should be abolished to spur demand. But considering how close the government is to breaching the fiscal deficit limit, which is 3.3%, do you think it's a good idea?

Why is 3.3% so sacred? Why can't it be 10%? It's called thinking out of the box.

Suppose I tell you, I build 8 lane highways, from Delhi to Bombay, Bombay to Madras, etc. How to finance it? Print the notes. Give it to the workers. What will they do? They'll go and buy in the market. If you have today a demand problem, it will be over tomorrow. Public work is the most important thing. So, how did the American Depression come? The American president, in order to please the electorate, he said, "I'll remove unemployment by persuading the unions to reduce the wage rates by 10%." So the unions were persuaded. They lowered it by 10%.

Unemployment increased and nobody could understand until John Maynard Keynes came and explained. When you reduce the wage rate, you also reduce the purchasing power. So the demand goes down. This is what Raghuram Rajan did. He kept on raising interest rates and the cost of capital kept going up. He kept on saying that he was controlling inflation but small and medium industries collapsed. Today, there's the highest unemployment in history because of this man.

I would say that if the total amount of personal income tax is about 4 lakh crores, my first defense would be that I enabled you by going to court and getting the allocation of spectrum arbitrarily canceled and let you auction.

Anyway, the issue you see is that, you've got to get your machinery started and what will happen, suppose I print notes and I build these highways. Then, I pay the workers with the printed notes, they'll go and spend it, demand goes up and boom.

Q.5 Zimbabwe tried to do this thing during its depression state, right? It tried to print notes and inflation skyrocketed so much so that they had to print notes in denominations of lakhs and so on.

Dr. Swamy: I don't know if they had enough supplies. Today, we have an oversupply. People are ready to give huge discounts for buying cars. Inventory is going up everywhere. We've got to get the demand thing settled.

Q.6 Don't you think the government is not trying to look at this side of the issue?

Dr. Swamy: Honestly, they've no clue. I have known the PM since 1972. So the issue is this, you see, the government has no clue. In the case of the UPA, Manmohan Singh knew Economics. It was Chidambaram, who knew no Economics. But Chidambaram knew how to make money. For himself, not for the country. Maybe he'll learn some Economics in jail.

Q.7 Statistics have shown that sixty percent of agricultural products that were sold were below the minimum support price. This was around the time that the government had introduced the PM KISAN scheme and in the first phase, the revised estimate was about twenty thousand crores, so this is like a lump sum subsidy. Do you think that such a lump sum subsidy could take care of the pain that farmers have right now?

How will the subsidy reach them?

Make them export. Help them. Put up cold storages, small airports. Put good roads so that their products can reach the Bombay harbor fast, fight in the WTO. Do you know

how cheap our milk is? The Indian cow, medicinally called Bos Indicus, its price is one-sixth of what they pay in Europe. In America, you go to the supermarket, there is this separate carton called A2 Milk. It costs four times more. And it's written there, *milk of cows from India*. They are doing it.

But we are not able to do it, because we have all these bureaucrats and the first thing they will discuss is, "Can you get my son into one of the universities here?"

Q.8 Sir, what do you think of the idea behind a scheme such as PM KISAN?

Dr. Swamy: PM KISAN is all a waste of time. There are many leakages all over on the way. It's one more way for politicians to make money. We should empower them. I tell you that farmers will learn the internet in no time. People are very very intelligent. So you educate them, find out their buyer, and teach them how to package. Our flowers are much better than the Amsterdam flowers, but there is no packaging. Our milk, there is no pasteurizing, there's no bottling. These are things that should have been more focused on.

Q.9 The union government has still not released the data on the actual expenditure estimates. (Question asked in October 2019)

Dr. Swamy: You know why? I'm going to file a case on this actually. Chidambaram, when he was finance minister. You see now, we can print notes. But we don't have the paper to print it on. It's a special, watermarked paper. So we were buying it from abroad. Chidambaram decided there is a British company called De La Rue, and his son got a kickback, so he decided to give it to them. Our intelligence people went to Chidambaram and asked him to not do it because De La Rue was also printing paper for Pakistan. It's a private limited company. So Pakistan can say, give us some of the watermarked currency paper (in exchange for a bribe). They are a private company and they don't owe India anything. And that's exactly what's happened.

So all the counterfeit notes have been brought into our system by the ISI, have Indian watermarks. So today we have a larger number for the currency in circulation than we printed.

Q.10 Sir, according to you, what should the government do, to deal with the slow down in the very short run?

In the short run, abolish personal income tax. Second, lower the rate of interest on loans to 9%**.** Third, raise the rate of interest given to fixed deposits to 9%. The economy will turn around tomorrow. If you have no experience in the business, you will find that difficult to swallow. But that's what you have to do.

Why don't they abolish income tax? Because it gives control of people. We have a bunch of sadists also in our government. Almost everybody in politics is blackmailable. So there is nobody to speak up. They start talking about $5 trillion. We calculated the required rate of growth, 14.4%! And then the FM says it is just in current prices. How can you say at current prices? If there is inflation, then you don't have to do any work.

Q.11 Sir, do you think that the government has the right advisors?

The government has advisors, but they are too terrified.

Q.12 Sir is there any recent economic policy initiative of the government which you like?

Economically, there is nothing.

From day 1, there have been stupid policies. This country is a very strange country, people are very sentimental. Narsimha Rao produced the best economic growth of five years, he was badly defeated. What's the explanation? Vajpayee came up with India Shining, everybody liked him, and he advanced the election by six months. And our strength came down to half.

We are heading for a crash. People, don't care in our country, for economics unless they are out on the street. If the Maruti car company closes down tomorrow, it will be good for India because then everybody will wake up.

Q.13 When the government is mainly sending out this message of 370 and Ram Mandir, wouldn't the many economic issues get trivialized?

Mr. Swamy: It is trivialized unless it leads to collapse. Then, it affects your family. You can't bring bread home. Your savings are wiped out. Then what do you do? The whole climate has changed, lies are difficult because social media uploads it right away. So we have no challenge except if people start starving, people don't know how to pay their rent, etc. When that situation comes, none of these non-economic messages are going to affect the citizens' concerns over the economy.

Q.14 Sir, since you were into so much into research in your undergrad and postgrad days, so do you have any tips for the Indian students interested in research?

Dr. Swamy: I would say to Indian students, which is how I developed myself, don't depend on your professors, except for courses and getting grades and your GPA and things like that. You start looking at journals. You won't understand in the beginning very much. Just go through them, see how much you can understand. There's a Physics process, a term called osmosis, have you heard it? Nothing clicks for a long time, then suddenly everything clicks. I'd say you can read journals like Econometrica, etc. And if you want to know about India, I would suggest you read these pink papers like Business Standard and Business Line of Hindu, etc. Of course, you have to read prescribed textbooks because you have to do well in your exams. But the originality comes from reading journals. You may not understand anything, but it happens, it happened with me.

I spent all my time in the library looking at journals and then suddenly, I found a way to demolish a man's theory, who was the right hand of Jawaharlal Nehru (Professor Mahalanobis). We met just before his death.

He had taken the Lorenz Curve and passed it off as fractile graphical analysis. So, my paper was sent to Econometrica and the person who refereed it was the Committee Chairman. He immediately said that I was admitted to Harvard, I had got a scholarship. They sent the paper to him for an opinion. He did not reply.

Anyway, read Econometrica or Quarterly Review, just go through it, see what are the subjects. It all ferments into your mind. At the same time, you should learn as much Mathematics as you can.

Understanding the Impact of Immigration, Inequality, and Unemployment vis-a-vis the Politics of the 21st Century

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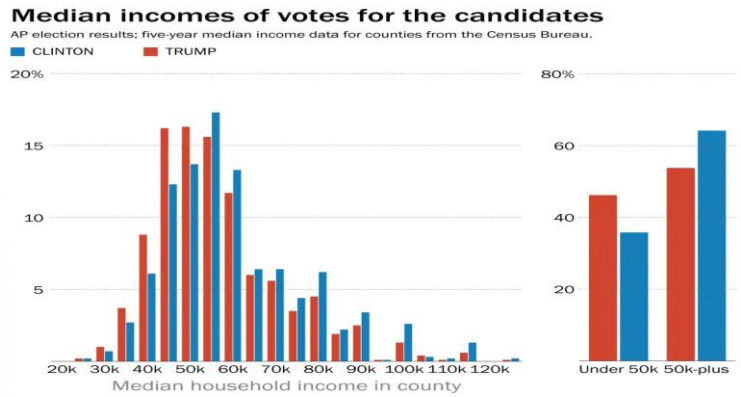
Turbulent, tumultuous, tempestuous. The political developments of the last decade can be aptly configured within these three terms. A decade that offered scores of political upsets, to such an extent that anomalies became a norm, and perhaps the only thing that remained consistent was Putin's reelection(s).

However, on comprehensively studying these elections, we can securely deduce the salient and underlying similarities shared in these elections. While the reasons behind these results are evenly divided between sociological and economic factors (primarily macro), this article will be limiting its scope to the latter.

Chapter I: Trump's Triumph

It's a regular evening at the McDowell County in West Virginia, two hours have passed since the sunset, and nearly two decades since the last coal mine became defunct. The residents, a healthy majority of whom were former miners, have been struggling, in all aspects of their life ever since. Most of the residents here are dependant upon food stamps for their survival, however, strikingly enough, the county overwhelming voted for the Republican candidate Donald Trump in the Presidential elections. (1) What was even more conspicuous was a phenomenon of counties, of the likes of McDowell county voting for Trump. An Associated Press release further bolstered the hypothesis that the poor had indeed voted, en masse, for Donald Trump.



(Voting patterns observed in the 2016 Presidential election) (2)

In an election marred by controversies, that went down to the wire, Trump emerged victorious, crushing, his Democrat opponent, Hilary Rodham Clinton. A key factor in Trump's resounding victory had been the support he garnered from the Southern

'Bible Belt' and the counties he flipped in the democrat held 'Rust Belt'. Though miles apart, the poverty-stricken economic conditions in both the belts bridged their geographical gaps and resulted in the undermining of the Democrat 'Blue Wall' in Midwestern America.

Most of the counties that supported Trump, in fact, had an economic profile closely resembling that of McDowell County- low income, high employment, primarily engaged in the manufacturing and mineral extraction sector ie. the bastions of the "White Working Class". While Trump never won the poorest of the poor counties, he was successful in gaining an upper hand in economically underperforming indigent counties, which had failed to cope from the 2008 Financial Crisis. The same can be said for a nationwide level where relatively poor states voted for the Trump, while the economically prosperous states voted against them. (3)

Enter Economics

Ever since the days of Franklin Roosevelt, Democrats have increasingly leaned towards a leftist model of governance, which reached its epitome during the term of Barack Obama, with Obama care and Carbon tax, amongst the most debated. Republicans, on the other hand, have advocated on a self-resilient governance model, which would intern mean limited social security benefits. Yet, Trump, the Republican nominee won a landslide amongst the lower-income states, while, Clinton, who had publicly advocated for a higher income tax, won a majority in some of the richest American states, and so the paradox begs a question: Do the American voters love shooting themselves in the foot? Don't the economic interests matter to them? (5)

The answer, however, is an antithesis to the popular opinion. They voted to keep their economic well being in mind. Keeping aside some condemnable incidents, Trump's electoral manifesto was pivoted around anti-globalization, anti-free trade, and anti-immigration.

The residents of the "Red" states, primarily specialize in activities that fall under the Primary Sector and Secondary sector of economic activity category, and can be catalogued in Manufacturing (Pennsylvania, Michigan, Texas, Ohio), Oil and Natural Gas extraction(North and South Dakota, Texas, Colorado, Alaska), Coal mining(Kentucky, Pennsylvania, West Virginia) and Agriculture (The entire area consisting of the great plains).

The residents of "Blue" states, on the other hand, are primarily dependent upon tertiary sector activities, which include financial advising and investment banking, Information and Technology and Commodity Trading- with the most notable states in this direction being California, New York, Washington, Illinois, and Massachusetts.

The aftermath of WWII ushered an era of economic prosperity. While the Free Trade agreements brought enormous economic capital, lenient immigration policy attracted the much required human capital. The end of the Cold War further fortified the Free Trade system. However, this took a turn for the worst in the year 2008, when the world was hit by a Financial crisis, having its epicentre in the US. Approximately, 2.6 million jobs were lost during the depression. (6) While the process of recuperation was commendable, it still left much to be desired. The Tertiary sector economy made

a heroic recovery (which now boasts of an 80% in the American economy), whereas the Secondary and Primary sectors, which were already underperforming, failed to reclaim the lost ground. Further, the availability of cheaper alternatives in developing nations coupled with the emergence of AI added to their misery.

In less than a decade's span, the American working class had lost their savings, but more importantly lost its economic relevance. By the turn of the second half of the decade, anti-globalization and anti-immigration sentiments were at an all-time high in the US, amongst the working-class Americans. Trump all through his election campaign, emphasized on the notions of "bringing jobs back to America", "deporting illegal immigrants", repealing the 'Carbon tax' (while voraciously denying 'Climate Change' in the face of credible evidence) and in turn "making America great again". These promises instantly found themselves a soft corner in the hearts of the working-class Americans who were struggling in recovering from the 2008 Economic crisis. And on the eve of the 9th of November, the results were evident that the Democrats bore the brunt of the distraught 'White Working Class', as Trump ascended to the Presidency.

Chapter II: Rise of The Right (Deutschland, 2016-)

The summer of 2013 marked the (electoral) birth of the AfD (Alternative für Deutschland); a euro-sceptic party that was founded in the backdrop of the Euro-Zone Bailout crisis in Greece. While the AfD had a forgettable run in their debut election, failing to clinch even a single seat, in 2017, the party improved its fortunes by notches, by winning 90 seats and emerging as the largest opposition party in the German Parliament.

The party's roots were laid by Bernd Luckin the backdrop of the controversial Euro-Zone bailout. By 2008, in the aftermath of the Global Financial Crisis, several Euro-Zone countries including Spain, Greece, and Ireland saw an economic collapse and a 'prosperity bubble burst'. With the debt-to-GDP ratio soaring the counties had no option but to opt for economic aid packages. Germany, which has, ever since the creation of Euro-Zone has been at the helm of affairs, was generous in contributing to this cause. However, in 2013, in the face of perennial political turmoil, when the countries failed in repaying the debt, the German chancellor proposed a bailout package. This was received with extreme criticism by Euro-skeptics and conservative politicians, who expressed their dissatisfaction with the creation of AfD.

Fast-forwarding to 2017, with the German elections around the corner, the AfD much like the Republicans presented a manifesto which boasted of a 'not-so' uncanny resemblance to its Republican counterpart. The manifesto was centred around anti-immigration policy, a nation first internal policy, a conservative foreign policy, coupled with unbridled contempt towards economic treaties.

A fractured Re-Unification

After nearly five decades of political separation, the East and West Germany unified to form the modern-day state of Germany. Though however, heart kindling it may

sound, the reunification came with its own fair share of the burden, with handling economic inequality being the most thorny.

Helmut Kohl, the then chancellor of West Germany, in order to alleviate this economic inequality and disparity, suggested for the privatization of the government-owned industries. This idea was materialized in the form of Treuhandanstalt, an agency, created by the East German govt. for privatising the industry and oversaw the restructure and sale of nearly 9000 state-owned industries, directly affecting a minimum of 2.5 million people. In addition to privatization and reprivatization of state held industries, the government also introduced a series of incentives for industrialists, nationally and internationally, to invest in the East. The most notable of these incentives included circumvention of collective agreements and undermining labour unions. A direct result of these policies is evident in Saxony, where only 39% of the employees are protected under collective agreements, which is far lower than the average in West Germany, which stands at an envying 57%. (7) Treuhandanstalt was also the site of various corruption scandals which wrecked the German standards of transparency and was dissolved in the year 1994 after having amassed an estimation of 270 billion marks in debt. Its legacy, however, continues to haunt the working-class East German households, which receive fewer benefits and lower wages than their Western German counterparts. These also made blue-collar workers in Eastern Germany more vulnerable to Economic recession and downturns.

Another important factor is high-income inequality that, even today presents a stark dichotomy between the two areas of Germany, with the most noticeable being the difference in per capita income between them. An average household, residing in the Eastern part of Germany barely makes 70% as compared to their Western German counterparts. Making matters worse, though, the unemployment rate has seen an overall decrease, the risk of poverty for unemployed people has been the highest since reunification. In fact, unemployed in Germany have the greatest risk of poverty in the EU at a staggering 70%. (8) Again, states, part of the former German Democratic Republic have amongst the highest proportion of unemployed people in the republic. (8) Five of the eight states having an unemployment rate higher than the national average saw the rise of AfD as a formidable political party and rewarded it with the second-highest number of seats in all of these states (Thuringian, Saxony, Saxony-Anhalt, Brandenburg, Mecklenburg-Vorpommern- Which happened to be a part of the erstwhile GDR).

The Global Financial Crisis, The refugee crisis and the AfD

For Eastern Germany, perhaps the straw that broke the camel's back was the Global Financial Crisis of 2008 and the slowdown that followed it. Eastern Germany residents, already suffering from lower per capita income, lesser income securities, reduced welfare benefits and higher risks of poverty, were caught ill-equipped to handle the crisis. The growth rate in Eastern Germany recorded a steep decline to a miserable 1% even after 3 years since the crisis, while the unemployment rate ballooned further. (9) Merkel led CDU's ignorance towards these issues culminated in countrywide resentment and ultimately, in the formation of AfD, with the aim of

providing an "Alternate for Germany", with prominent economists being some of its key leaders.

In 2015, Merkel, against widespread criticism, opened its borders to Middle Eastern refugees. AfD reacted by making a strong deviation from its previous stand, becoming a platform for anti-immigration discourses. The residents in Eastern Germany were averse to the prospects of foisting migrants, whereas their Western German counterparts wholeheartedly opened their arms over the proposition. A plausible explanation of this knee-jerk reaction can be directly traced to their socio-economic status and the Law of Demand and Supply.

Refugees are largely unskilled or vocationally trained workers, that make a natural fit for the Manufacturing and Agriculture sector. This created widespread paranoia amongst the lower-income households in Germany, which again, were disproportionately located in Eastern Germany. A greater unskilled workforce, with stagnant market demand, meant a lower bargaining power for the blue-collared workers.

With dark clouds of uncertainty looming over their financial future and having their backs against the walls, the blue-collared German workers had no option, but to vote for the right, which was the only party addressing their concerns and insecurities. This resulted in an electoral mandate that toed that of the USA in 2016, in spirit and in the outcome. The AfD won resoundingly in states having a high unemployment rate, low per capita income, and being disproportionately engaged in Agriculture and Manufacturing sector.

Chapter III: Wrath of the 'Workington Man'

Workington, a tier two city located on the coast of northern England, a landscape dotted by defunct coal mines, and factories which today remain the last reminiscence of the once throbbing city. With a population of barely above 25,000 souls, living in a city marked by decrepit infrastructure, the city possessed nothing sensational, worth offering to the national dailies, at least till the coinage of the term 'Workington man'.

The Workington man, a term coined by the conservative think tank 'Onward' to refer to a voter that is a "stereotypical working-class, 45-plus white voter (more often than not, a man), without a college degree, residing in the North England, who had previously voted for Labour, but voted against the party line during the Brexit referendum. Another characteristic, identified by Onward about the Workington man was the economic insecurity that was instrumental in his vote, in conjunction with a slight degree of xenophobia and Euro-skepticism.

Loyal to the left, and coming from a blue-collared background, the Workington man had, at least in the last 3 British general elections voted for Labour. Much of the labor 'red wall' in the north of England, stretching from Manchester to Midlands and in the northeast of England, was trestled on the back of the Washington Man. (10)

The first jolt that hit the placid British politics came in the year 2016, where the Labour bastions in the north and northeast of England, going against the party line voted in favor of leaving Brexit, much to the delight of the right parties in the UK. Brexit, however, was not the greatest political upset for the Labour, as the decade had

a bigger surprise awaiting them. In 2017, a surprise election, called at the behest of the British Prime Minister Theresa May, in an attempt to further strengthen the Tories majority in the parliament backfired as the party lost 13 seats while aiding the Jeremy Corbyn led Labour, who increased their tally by 30 seats.

However, despite the electoral setback, partly owing to divided leadership, the Conservatives were successful in making major inroads into the Labour strongholds. Bishop Auckland, for example, had elected Labour in every election since 1918, but in 2017 saw the Labour majority shrink to 500 votes.

In the British parliamentary form of democracy, working on the first past the post system, the objective for the Boris Johnson-led conservatives to win the elections was extremely straightforward if not unambiguous: Win over the Workington man, and cruise with a majority at Westminster.

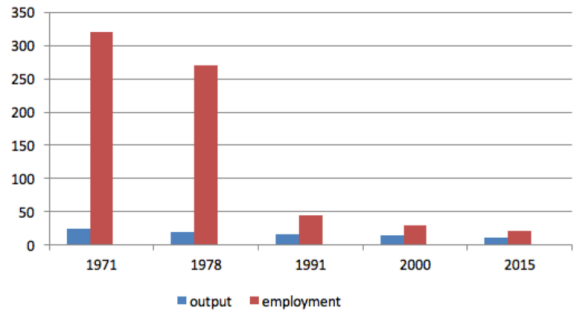
Economic background of the Workington Man:

The economic insecurity of the 'Workington man' is entangled to the high unemployment rates and low GDP per capita in his neighborhood. Delving further, the Workington man, in his prime days was employed in the manufacturing sector. (11)

In the UK since the second half of the 20th century, the UK has been undergoing the gradual process of de-industrialization, as a consequence of Globalization. While globalization has helped corporations in reducing their manufacturing costs, fueled the growth of Metropolis across the country and added some much-needed diversity in the demographic dividend of the country, it has also played a key role in exacerbating de-industrialization. A direct impact of this process is evident in the north of England and Midlands, where according to the former advisor of treasury, Diane Coyle, "*The UK's 'Leave' vote could be seen as a vote against globalization and its uneven impact on different parts of the country, rather than a vote specifically against the EU. The proportions voting for Leave were higher in the Midlands and North of England, where de-industrialization struck hardest and where average incomes have stagnated. London, the UK's only truly global city, saw growth and a high share of Remain voters."* (12)

While Globalization has resulted in a gradual decimation of the manufacturing sector in the UK, advancement in technology has been critical in rendering several low skill workers unemployed over the course of time. Shipbuilding, car manufacturing, Iron ore production, some of the prominent economic activities covered under the realm of the manufacturing sector, have either stagnated at their pre-1970 production level or have recorded a slight decrease in their output. However, in terms of their employment generation, the manufacturing sector has, in absolute terms, recorded a steep decline.

Figure 2 The British steel industry: Employment and output



(13)

What makes this loss of job even more crucial is the fact that the manufacturing sector, had for centuries been the sanctuary for low-skill workers with basic education, providing them with a secure job and a stable income. However, with increasing technological efficiency and stable demand, the availability of jobs in this sector has significantly reduced, while the number of applicants has contrastingly increased.

Years of economic insecurity, increase in the cost of living, and increasingly stiffer job competition for the same jobs; while metros like London developed at unprecedented scales, the countryside in the North largely remained untouched by this prosperity and so did the Workington man.

Economically reduced to the fringes and politically marginalised, the Brexit vote was no less than a leash to a new life for this Labour supporter. For perhaps the first time in decades, the Workington Man in the pivotal position of influencing his destiny, and sided with the party that was in favour of the Brexit motion. The Brexit vote in 2016 and the Tories landslide victory in 2019, were nothing more than a flex reaction to the seething feeling of inequality and political marginalisation. As for Workington, the conservative candidate Mark Jenkinson won the constituency in the 2019 election.

Concluding Notes: Was this voting shift unprecedented?

In 2016 the IMF chief, Christine Lagarde in "Making Globalization Work for All", argued on the need for all-inclusive growth. (14)While, it would be grossly unjust to deny globalization, its fair share of credit in aiding international financial prosperity, has either directly or indirectly rendered large sections of the workforce in the developed countries-irrelevant apart from the increase in income inequality. Advancements in Artificial Intelligence might have been instrumental in steaming these financial markets, however, it inevitably leads to the situation of "Jobless Growth". Years of neglect, political marginalization, and apathy towards the cause of the White working class has led to a situation of political isolation. This isolation can be treated as one of the key factors as to how Poll Pundits across the political spectrum were unable to gauge the strength of this undercurrent which with time turned into a Conservative/Republican Tsunami.

Another development in this regard has been a gradual, but constant decline of Social mobility in the Western world, especially the USA and Western Europe. While there are countering claims available on this claim, there is a consensus that Social mobility in the USA has not increased. (15) While there has indeed been an absolute increase in Social mobility, the relative increase remains diminishing, meaning that ascending the

social and financial ladder is becoming increasingly impossible. According to noted economist and Harvard professor, Raj Chetty, in the 21st century the USA, the 'occupation and family background of a person has become more important than it was 30 years ago'.

And lastly, the last nail in the coffin can undoubtedly be the 2008 Financial Crisis. Millions of low skilled blue-collar workers were laid off as a part of the process of cost-cutting. Just as the growth had been disproportionately beneficial for a specific sector of the economy, so was recovery, with scores of industries capsizing forever. All the relief efforts, in the form of bailouts and zero-interest credit, were sufficient in mitigating the damage but were never sufficient enough to reestablish the now uprooted industry in the manufacturing sector.

The election of far-right candidates across the 'developed' Western World, by the working class, was the equivalent of their last bet on reaffirming their control over their financial destiny. While the anti-globalization and anti-free trade policies were abhorrently repelled by the urban dwellers (who in turn were dependant on these economic forces for their well being), they found for themselves a soft corner in the countryside and rural. For several voters who had been marginalized from the system, the election of fervently-eccentric anti-establishment leaders like Donald Trump and Boris Johnson was nothing short of slinging a 'Molotov' at the face of the establishment.

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General Articles

Nifty 50 - A Little Shifty

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About the disparity between the stock market indices and the failure of Nifty to act as a barometer for the Indian Economy.

There's no two ways to say it - the Indian economy has taken a beating in the recent past. Inflation-adjusted GDP has grown at a staggeringly slow 5% in the Q1FY20, and the country's economic growth has refused to pick up even in Q2FY20, staying at about 5%.

Another signal of the economy's fate is that Moody's Investor Service has cut India's 2019 GDP growth forecast to 5.6%. The agency predicts growth rates to rise to approximately 6.6% in 2020 and 6.7% in 2021, but they believe that the rate of growth will never be as high again. The economic slowdown can be primarily attributed to shrinking employment rates that only add to the burden of waning levels of consumption. Of course, there will always be a myriad of factors that push an economy into a recession, but this time around the blame for India's economic situation belongs to these two factors.

While it has been established that India is facing a recession, the question is about whether it is cyclical or structural in nature. A cyclical recession is one that occurs over the short-to-medium time period and is largely attributed to fluctuations in the business cycle. A recession of this nature would ideally be resolved through interim fiscal and monetary measures coupled with a temporary recapitalisation of credit markets and other regulatory changes. A structural recession, on the other hand, is a beast of a different nature. Recessions that arise due to structural issues generally last for long time periods. These slowdowns are driven by either disruptive technologies and/or changes in consumer behaviour. Although industry experts initially believed our current slowdown to be cyclical in nature - a dreadful combination of low demand and excess capacity - some analysts have now started to fear that this recession may in fact be a structural one.

Another heavily emphasized factor for the economic downturn is the auto industry. Although this article does not aim to breakdown the many facets of the auto sector slowdown, it is necessary for readers to grasp the bare-bones of it to assimilate our main point. Now, the Indian auto industry has faced slowdowns before, most recently in the mid-1990s. This time around, however, the slowdown has lasted longer. The liability for the prolongation of this particular crisis lies on the mixture of a drop in private investment and a banking crisis that has made access to credit elusive. It would be premature to assume that the introduction of disruptive technologies like Ola and Uber, to name a few, is responsible for the complete drop in consumer demand. The

auto industry does not merely consist of light consumer vehicles(LCVs), when in fact a large chunk of the demand within the sector comes from heavy consumer vehicles (HCVs). The NBFC banking crisis has made it troublesome for farmers to get lines of credit to purchase heavy vehicles such as tractors etc. Thus, the drop in demand from the HCV side has contributed equally to the total drop in demand that has sent shockwaves through the auto sector.

At this point, we've clearly outlined the many reasons the Indian economy is headed for a nasty turn in the next few quarters and established that we are, indeed, facing an economic recession. Therefore, by extending the logic described, it follows to ask if the Indian stock market must also have taken quite a hit? Strangely enough, the answer is no.

It seems intuitive that stock market indices should mirror the economy's plight, and this intuition isn't baseless. Stock market indices were created to reflect the behaviour and performance of the companies under them. In the Indian context, we look at Nifty50. Nifty50 comprises of 50 stocks in the market and is calculated using the Free Float Market Capitalisation methodology. All jargon aside, if the market's future expectations seem bleak, investors would choose to withdraw funds from the market and thus, cause the market indice to take a plunge. This logical prediction could not be further from the reality of the situation. As the Indian economy has plunged into a slowdown, Nifty50 has been rising steadily. As of December 18th 2019, Nifty50 has achieved a high of 12,221.65, while Nifty MidSmallCap 400 had achieved a measly 5787.4 till December 2nd, 2019.

To summarise and elaborate and twisted explanation of the two indices, one can say that Nifty 50 comprises of the largest companies in the country in terms of market capitalisation whereas Nifty MidSmallCap 400 consists of 400 companies that are considered small and mid cap. The true story of the Indian markets would indubitably be narrated by the behaviour of Nifty MidSmallCap 400. But the reason Nifty50 has experienced a period of growth could rationally be the surge of investment into blue chip companies that make up the index. Traditional avenues for investment such as gold and real estate have become less desirable. Wealthy individuals in India have generally never shown a high propensity to invest in the stock market which may be due to their inherent risk-averseness. But, if other sources to invest have dwindled down and their only option was the stock market, they are much more likely to place their money in blue-chip stocks that have historically given returns with little to no risk. At the same time, Nifty MidSmallCap 400 did not experience this injection of wealth. It fluctuated given the performance of the small and mid cap companies in the country, thus betraying the true situation of the economy.

The disparity between the two indices tells us something crucial about the standard stock market index as a barometer for our economy : the behaviour of an index should no longer be used to diagnose and predict the condition of the economy. If anything is to be used, it must be oil prices and in turn, exports of the country as these numbers allow individuals to evaluate the real demand and supply of an economy and not be deceived by the herd mentality.

Why Economists Were Irrelevant Back Then and Why They Once Again Can Be?

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Jared Diamond, in his book "Guns, Germs, and Steel" explains how societal stability came into existence. Farming and domesticating animals provided social stability that was lacking in hunter-gatherer societies. Farming allowed for the production of storable food, and therefore unlike hunter-gatherer societies, people did not need to work everyday for their food. Farming made the quest for survival of society somewhat easier. Over a period of time, the adoption of improved farming techniques increased the productivity of agriculture. Examples of improved farming techniques can be thought of in terms of the use of a better breed of animals in cultivation and the use of heavy plough as indicated by Anderson et al (2016). This improvement in farm productivity resulted in more spare food being available for society, and hence allowed a portion of society to pursue non-agricultural activities e.g. craftsmanship, art, trade. This process of an increase in farm productivity continued, which essentially meant that a fewer number of people could now produce food for a larger number of other people who were pursuing non-farm activities. This therefore allowed for the movement of labor into non-agricultural activities centered around towns.

Over time, unions resembling trade unions, such as Guilds, came into existence to ensure the smooth operation of non-farm activities. This cooperation of people allowed them to fight together against threats to their survival. Therefore, this helped keep society from a breakdown, or in other words helped bring order to society. The Master of the Guilds was there to take a decision for all economic agents in the guild regarding the quantity, price and market. Robert Heilbroner called this type of a system as a 'tradition' which was passed on to generations and ensured order in society.

There was another type of system that came into existence and made society fall in order. This system was authoritative in nature, and was popularly called as a 'command' or 'control' system. In a command system, there happened to be an authoritative ruler, dictator or a group of elite people who were authorized to decide the type and amount of goods that would be produced by an economic agent under their command-region. In these systems of social order, which were heavily under the religious influence of the Church, working for profit or one's personal gain was considered as a sin. It was not appropriate for one to be profit oriented. The decisions regarding what to produce, how much to produce and where to sell were all taken by the elites, and therefore little was left for somebody to talk about economics. Hence, economic analysis and policy suggestions were useless, or economists were irrelevant, back then.

Post 1600, the rise of technological advancement and scientific curiosity, the emergence of national units in Europe, the decay of religious influence, and an increase in exploratory voyages to different parts of the world, all together moved with an increase in trade. This increase in trade called for a greater demand for goods,

and the greater demand for goods caused more technological advancement. Whether trade caused technical advancement or technical advancement made trade possible is not the main idea here - what matters is that both increased. On the other hand, the Protestants' social movement, led by Calvin, resulted in the acceptance of working for one's gain as a normal thing to do. Protestants viewed prosperity as the grace of God, and poverty as something that God did not want to prevail in the society. This new social view allowed people to pursue economic activities for their personal gain. The greater demand for goods due to a larger volume of trade supported the setting up of new private enterprises working purely for profit. This acceptance of profit as a correct or proper thing to do, put together with the aforementioned factors resulted in the emergence of a third system of social order.

This system is known as the market system or the market mechanism. In this system of social order, society is safe from breakdown because everyone is working for their gain and unknowingly creating opportunities for others to pursue their gains or increase their wealth. In this system of social order, the decision of production is left to individuals. It was then that the laws or theories of optimal utilization of economic resources started making sense: first, because it was appropriate for one to make profits, and, second, because one could now take decisions for one's production problem. Around 1776, Adam Smith, the founder of modern economics, published his masterpiece "Wealth of Nations" and with that the journey of economists is believed to have started.

In the last two and a half centuries, many eminent economists have contributed, and through their contributions, guided the world to prosperity. Technical advancement has accompanied this prosperity. The need for a better understanding of economics has also increased with prosperity. While many countries have made spectacular progress on the path to development, some of them have not. On the other hand, we have seen financial crisis from time to time, the most recent one being in 2008.

Eminent thinkers and Nobel Laureates have cautioned the economic community of contemporary understandings of the economy. Fredrich Hayek called for not formalizing everything into scientific knowledge. In his seminal paper "The Use of Knowledge in Society", he said that by virtue of its design, a large amount of society's knowledge cannot be put into formal mathematical models. The "man on the spot" knows best about the time and place - the central planner should respect that, and hence find ways to use that knowledge of society.

Paul Krugman, after the 2008 financial crisis, in his article "Mistaking Beauty for Truth", criticized economists for their love of the elegance of mathematical models which they forcefully applied to economic conditions. The mathematical beauty or elegance of economic models was appreciated in elite circles rather than the practicality of the same. This excessive formalization and what Krugman calls as "getting seduced for mathematical elegance" did more harm to economic models than good, which otherwise could have been closer to reality. In public spaces, many voices called for economics to re-invent itself or the need for a scientific revolution in economics. Take, for example, Jean-Philippe Bouchaud's article in *Nature.*

Macroeconomic models these days consider the New Keynesian model of representative agents with price stickiness and monopolistic competition, which is a

significant improvement over previous models. Many respected economists are trying their best to understand how exactly it is that economics works. However, the role of money is taken as a facilitator of transactions in almost all models. Money is neutral in the long run is what we know from contemporary macroeconomic models. But money can have a quantum interpretation. To understand this, consider quantum physics - the magnitude of attributes such as position or momentum are fundamentally indeterminate until measured, and according to the uncertainty principle cannot be known beyond a certain precision. Similarly, money's use in transactions is a way of attaching a number (the price) to the fuzzy and indeterminate notion of value, and therefore acts as a quantum measurement process. When you sell your car, you don't know exactly how much it is worth or what it will fetch; the price is revealed only at the time of transaction.

Therefore, in sum, I believe that economists should not put knowledge, that by nature cannot be explained by formal models with certainty, into their mathematical models. Doing so in fundamental models may accumulate into lots of errors that might ultimately result in a crisis. If the realities of the world are not allowed for, making claims with exaggerated certainty may bring down the credibility of the profession, or in some sense its relevance. To remain relevant in the contemporary world, something needs to be changed fundamentally to make room for uncertainties and a better understanding of subjects such as money.

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Black Market For Baby Selling

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Introduction

Babies, like any other commodity, are subject to the laws of supply and demand. Whenever demand exceeds supply, conditions are ripe for the emergence of a black market. With liberalisation coming in the form of modern and progressive thinking, many parents are now unwilling to give up their children for monetary benefits. Because of the reduced availability of desirable children for adoption,' certain unprincipled profiteers have been able to capitalize on the situation, creating a small but thriving "baby black market". These adoptions do not conform to the established state and federal laws that regulate adoption, and which usually involve the payment of large sums of money to an adopted child's birth parents, an adoption attorney, an adoption facilitator, an adoption agency, or another intermediary, in order to avoid provisions of the law. In this article, we will talk in-depth about how the baby black market works, what different factors affect it and how prevalent it is in the contemporary world. We will also be discussing the case studies of China, Malaysia and Nigeria.

Structure and Functioning

Black market for adoption refers to the sale and purchase of babies that takes place outside government sanctioned channels. It is similar to any other black market which serves as the venue for illegal trade of highly controlled substances or products. The only difference being the ‘product’- the babies.

The buyers in this unregulated market constitute of the couples who are faced with long waiting lists and rejection from authorities for child-adoption, and ultimately turn to black market, since outright baby-selling is illegal, for fulfilling their desire of a child. Many region-specific problems have also led to a thriving black market for babies. Consider the case of India: couples have to deal with complex regulations, lengthy bureaucratic delays and corruption and hence, they are encouraged to enter and utilise illegal adoption markets. Changes in the existing societal norms where

couples do not carry the social stigma of adopting a baby of a different race or ethnicity, are ready to adopt foreign orphans available for adoption. The supply comprises of the unmarried, pregnant women and poor families, who misled by unscrupulous doctors and institutions are incentivised to sell their new-borns to childless couples. Already distressed by the thought of raising a child in poverty and an orthodox society, such families give up their babies who are eventually sold at higher prices. Other factors affecting supply can be region-specific, similar to that of demand. Chinese parents, for example, because of the one-child policy, abandon their second child or else have to pay fines and lose out on many social benefits.

Undoubtedly, the price in such black markets are very high and many a times, babies are obtained via kidnapping and coercion. This makes the entire concept of such markets all the more unethical and highly debatable.

Factors affecting black market adoptions

1) Psychological factors

Women face a lot of mental and psychological stress during pregnancy, mostly related to health and how the child would be raised. The financial position of a family plays a very important role in deciding whether a family can afford to have a child or not, as most parents want to provide their children with quality education, good healthcare and a stable lifestyle. But all this requires money.

Women who get pregnant when they are very young often face these kinds of problems. Without a proper education and a steady job, they become helpless as they are unable to provide for their child. Parents and society usually force these young girls to give up their children mainly because of the fact that these young women are inexperienced and don't have the mental and physical capability of raising a child on their own. Basic logic says that raising a child is a lot of work while giving a child up is not. This thinking within the contours of our society has shaped the way young women are made to think, they are faced with immense stress, societal imposed guilt of having a child out of wedlock and the constant reminders of how hard it is to make it on their own.

This issue is often also faced by people from an economically weaker background who cannot afford to take care of their kids. The mental dilemma that these people face is the fact that giving up their children would give the child a better life moving forward and the birth parents or young mothers would get some sort of monetary compensation that can be used to either make their life a bit more stable and hassle free. This process is what fuels the baby black market as the legal route is a bit tough to go through. Another aspect fuelling the black market (mainly the international one) is the newfound popular idea of "saving" children, who are suffering in other countries without the adopting parents thinking about the fact that these children could have been trafficked, forced into being given up or simply put up for adoption because the parents can't afford it.

2) Civil and Legal factors

It is a huge struggle to adopt ethically in today's time. With stringent and airtight legal procedures required for a public adoption, parents have become more willing to work

with private agencies in order to adopt a child. Legal adoption usually costs a lot of money and many families have to go into debt in order to fulfill their dreams of becoming parents. Contrary to common belief, there are not a lot kids available for public adoptions and adopting parents usually have to wait a long time before the whole procedure is completed. Whereas in a black market adoption, the process is easier and faster if not a bit more expensive. The baby black market is a seller's market, where the main motive is to serve the adopting parents and not the child. In private illegal adoptions, babies can be chosen according to the wishes of parents whereas through the legal route, children and adoptive parents are matched. Heavy duty restrictions are also placed on parents who wish to adopt and they are monitored regularly by legal adoption agencies in order to keep a check on whether the child is being treated properly or not whereas in private adoptions all these aspects are usually ignored. Experts on this matter say that tough adoption laws, long waiting lists, corruption along with red tape fuel black market adoptions.

3) Social and cultural factors

A lot of cultural norms play a huge part in enabling the black market of babies. Baby valuing indicates that racial and genetic preferences are associated with the cost of adoption. Parents in developed countries wish to come out as saviours of children of underdeveloped countries, this fueling International adoption market. In Asia, a lot of countries including India and China give a major preference for boys over girls. They go to extreme measures like giving up or killing female infants in order to have a male child. In China, adoptive parents are willing to pay atrocious amounts of money in order to have a boy. Adoption agencies and independent adoption agents establish fees with adoptive parents based on the characteristics of the children in the adoption supply pool, such as, race, gender, and supposed genetic strengths, including the parents' intellectual aptitude. Societal boundaries and culturally stereotyped thinking fuel the illegal trade of children.

4) Economic Factors

The inherent need for money to satisfy wants fuel the supply side of the baby market. Couples with low income and unmarried women give up their young infants for gaining monetary compensation for a better life. The demand side of the market is fueled by high income infertile couples who are willing to pay money in order to get a kid of their choice. A lot of medical professionals are also found to be involved in these kinds of practices, as in many countries, their earnings are not enough to ensure that they have a stable life. Couples that have many children, give up or sell some of them in order to guarantee the well-being of the remaining children unaware of the

fact that they might be leading their children into trafficking or abuse. The economics are clear: There is a lot of money involved with giving a child into adoption.

Case Studies

Societies and cultures have always influenced our habits, lifestyles and the way we think of our lives. It goes without saying that social and cultural factors have been responsible for how the nations work, how its economies function and how the citizens are affected by the decisions of the governments who themselves design the policies after taking into consideration these factors.

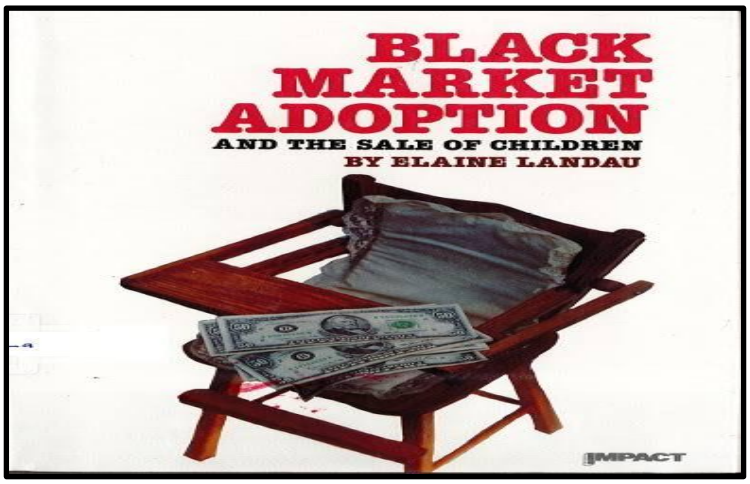
This same principle applies to the black market of babies as well. Reports about increasing rates of child abductions, quasi-legal adoptions and abandonment of children by their biological parents are a testimony to this fact. The 'one-child policy' implemented by the People's Republic of China in the year 1979 (later modified in year 1980s) can serve as an example to study how the government's control over reproductive freedoms of the people have led to a thriving black market in babies in the country.

When the ever-increasing population of China took a toll on the country's food supply and a massive famine in the year 1962 led to around 30 million deaths, officials took note of the rising population and decided to address the problem by limiting most Chinese couples to one child each through its 'One-Child Policy', now called as one of the history's biggest engineering experiments. Incentives in terms of social benefits (such as financial perks and greater employment opportunities) were offered to families who complied with the policy. On the other hand, couples based on where they live, would be fined for having a supernumerary child without a permit. Forced abortions and sterilization also became increasingly common during the tenure of the policy. However, in the year 2015, the Chinese government scrapped the one-child policy because of the concerns over ageing population. While the policy brought down the fertility rate from 5.8 to 2.8 in under a decade, in large cities, the fertility rate (no. of children an average woman is likely to have during her lifetime) is less than 1.6, well below the recommended (replacement) level of 2.1 and one of the lowest in the world. With a shrinking workforce, China is expected to be the first economy to grow old before it gets rich.

The state policy of planning the size of the families and in turn, the entire population, have left behind a shocking legacy of gender disparity and ruinous demographic imbalance. As sons were preferred over daughters during the one-child policy regime, the sex-ratio in China became skewed towards males. The country's gender gap – one of the biggest in the world – is approximately 118 males to 100 females, had dire consequences for both the society and the economy at a macro level. Forced abortions of female foetuses and infanticide had led to spike in crimes, prostitution, child trafficking and a booming black market for baby-selling. As of the year 2015, tens and thousands of babies are sold every year in China, either due to forced labour or due to illegal adoption. If reports prepared by China's Southern Metropolis Daily are to be believed, in 40% of the cases, the biological parents themselves sold their child for money. One reason of this phenomenon can be attributed to one-child policy. Parents who are unable to pay heavy penalties for having more than one child and prefer to sell them, more so in the case of female child. Daughters are usually sold for less price

as compared to that of sons. According to another report published in 2006, unwed mothers sell babies, often girls, in the underground market in China, and the sales are to parents who want servants, more children, or future brides for sons.

With the scrapping of one-child policy and changing attitudes towards daughters, there is a hope to completely resolve the problem of black market of baby selling but overturning the effects of 35 years of a controversial policy and a traditional preference for males will take a long time.



Nigeria, an African country on the Gulf of Guinea, has been in international media for the violation of basic human rights and the illegal 'baby factories' that operate within the country. In the year 2012, a UK judge raised concerns about the 'desperate childless parents' who are involved in the baby selling scams in Nigeria based on the evidence collected after questioning women who were going to this African nation seeking infertility treatment and ended up in selling their unwanted babies. Cut to 2018, according to the media reports, more than 160 children were rescued from a baby factory and 2 unregistered orphanages from Nigeria's main city Lagos. These two pieces of information along with the fact that it's very common for Nigerian authorities to raid such baby factories clearly indicates the magnitude of this problem and how fearlessly the underground black market of baby selling is thriving in the region. One of the major reasons behind this social malaise can be attributed to the fact that unwanted pregnant women are promised better healthcare and lured to enter such markets. Once they are in, their babies are taken away from them who later can be sold for adoption, used for trafficking to Europe or prostitution. Confused, scared and broken, often these women choose to stay quiet and do not report such crimes.

Malaysia has one of the strictest adoption laws in the world which were designed in order to stop baby farming in this South Asian country. However, like any other black market, here too these adoption laws have pushed it underground. Foreigners who are unable to legally adopt children from Malaysia owing to the lengthy, arduous process which involves a lot of paperwork and countless trips to adoption centres, are given a chance to choose their own baby based on gender, race and skin colour. The price of the product-namely babies- ranges from $400 to $7500. The desire to start a family combined with ineffective policing fuels this underground market. An exclusive documentary by Al Jazeera's 101 East programme in 2016 shows how a nexus between the doctors, government officials and traffickers makes it easier for the

opportunists to make millions by baby selling. Doctors and officials could even issue fake birth certificates to list the adoptive parents as the infant's biological parents. As Hartini Zainudin, a local child right's activist, exclaims," It's like a supermarket." According to Chan Tau Chau, one of the two undercover reporters involved in the making of the documentary, childless couples will continue to buy infants and traffickers will continue to make profits out of it unless legal adoption in Malaysia becomes more accessible and laws against baby selling are enforced properly.

Conclusion

Neither one can deny the existence of illegal, underground markets of baby selling all over the world nor one can avoid the moral questions that come along with the idea of babies being sold in the markets at profits. A large section of the society argues that a baby born in a poor family, whose biological parents are themselves struggling to meet the ends, is better-off to be sold to someone who is able to provide her/him with adequate opportunities for growth in life. This argument works in the case of unmanned pregnant women as well. Most of them are financially dependent on others and cannot provide a good future to their babies. This sounds understandable and morally correct too. Only if we assume that the 'buyers' are the ones who would always provide the child with proper healthcare, protection and love, baby selling doesn't seem to be much of a problem. But this is where the actual problem lies. How will the authorities ascertain that the buyers are genuinely going to make the future bright for such babies and won't push them into a dark world of prostitution, beggary, organ selling and trafficking? As of now, human beings don't have anything that can determine a person's intentions. Moreover, in the examples of China, Nigeria and Malaysia, we see that most of the time it's either the economic factors (profit making) or socio-psychological factors (preference for male child) that drive the demand-supply forces in this black market. Such cases often lead to the violation of basic human rights of new-borns who are unknowingly 'gifted' a life of use and abuse, sometimes by their own parents. This is the high time when governments all across the globe need to take note of this underground market. And instead of an outright ban, they should focus on the causes and look for reforms-be it the complex adoption processes, rampant corruption in public as well as health sector, social programmes that aggravate the existing gender disparities or anything that fuels such black markets for babies.

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Water-Wine : An Analysis of Water Investment Trends

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The 2015 movie *The Big Short* ended on a warning - that ace investor and predictor of the 2008 housing crisis in America, Michael Burry had now started investing in a commodity that is more often than not taken for granted. This was because he believed that it would become the next big bet, primarily because of our lax attitude towards it, and our underestimation of how grave the situation regarding its availability could be in the next few years. Nobody really thought that way about water. The concept of a resource being completely renewable is now slowly becoming mythical. This growing distance between the demand for and supply of water is widening a void that not only governments, but also financial industries around the world are apparently trying to close.

The first question that came up in my mind, and might come in yours at this point, was, "How does one invest in water?". This piece won't be about the perceived lack of water; we know that there is one. Instead, it will cover all the ways in which this takes place, how long this trend has been going on, the ethics of and possible intentions behind such impact investing, what is happening today, and what the future holds.

In the beginning, investing in water essentially meant that you bought land which had some underground water resources, or a water flow that goes through your property. The latter is covered by littoral rights, which also distinguishes between natural and artificial uses; for natural uses, the usage is free, while for artificial uses, the usage depends on other littoral rights' owners. Then, there's another form of a water right called prior appropriation- that says that the first person to extract a quantity from a given source for a beneficial purpose owns that source. Since some landowners may fight over surface water that may be common to them, they may be allowed to install some kind of pipework to alter the flow to some reasonable use.

It's extremely inconvenient for most global investors to simply invest in water resources that cannot be moved around with ease. Moreover, literally investing in water is not the only way to make money off it. As a result, the financial services industry has diversified the ways in which investors can place faith in a largely untested market like this and still make some profits. Purchasing water utilities and water infrastructure companies dealing with better methods of improving water quality is one of them. Creating funds in order to replicate a water index tracking a list of these companies is another. Green bonds have also become popular lately, allowing the public to place a stake in changing the environment for the better.

America has some of the biggest privately-owned water utilities companies. These include Aqua America, America Water Works, and infrastructure firm Xylem. Many of these companies are listed on exchange-traded funds (ETF in short) created specifically for water investments, in order to create an index with some performance benchmark. One such is BlackRock's iShares Global Water Index ETF, meant to

replicate Standard & Poor's water index's performance. BlackRock is one of the largest shareholders of institutional holdings in Xylem, Aqua America, and the biggest in California Water Services Company [1]. Veolia, a big water management company based in France, has multiple institutional holders like the Vanguard Group and BlackRock [1]. Goldman Sachs bought out Veolia's UK business [2], and tried, albeit unsuccessfully, to buy two other private water utilities in the UK in the past, and one of them was in combination with Blackstone Group, which also launched in 2014, a new investment vehicle called Global Water Development Partners for funding different water systems and projects [3]. There is also the Invesco Water Resources ETF and the Calvert Global Water Fund [4]. These ETFs have a number of companies in their portfolio, which, apart from some of the ones mentioned above, also include Ecolab and Xylem. This is just a number of cases in a sea of examples where not only investment banks, but also private individuals with money in the bank are buying up water systems, and building a tanker full of liquidity to capitalize on taking advantage of filling in the void of capital needed for public infrastructure.

Every such company - from Credit Suisse to Morgan Stanley - has a department dedicated to investing in energy utilities and infrastructure for sustainabilit. An article from Global Research, from back in 2008, outlines Goldman Sachs' aggressive buying strategy, that also included a buyout of Ondeo Nalco - a leading water treatment firm, unsuccessful bids for other water utilities, and an investment in Chinese bottled water - rather interesting because of China's problems in dealing with water, something that this article later deals with [2]. Goldman, UBS, Citigroup, Deutsche Bank, all of them consider water to be a commodity that will, in the future, be hotter and more precious than oil. The question arises whether privatisation of public infrastructure is better for nation-building in the long run.

An early discussion of this question was done in an article by the New York Times way back in 2008 [5]. It talks of the apprehension of Americans when foreign funds like Australia's Macquarie Group pour in investments into building roads. Coupled with the crumbling nature and inefficiency of government-run projects, the situation made it more pressing for private companies that are undoubtedly ruthless, and consequently efficient, to take control of these projects. There may be exhausting ways in which they raise revenue. For example, if it were toll roads, then they would increase the tolls. They would want to please their shareholders, but to what extent?

When corporations decide to provide dividends to their shareholders while their services are going down the drain, that is when they need to be held more accountable. Thames Water, the UK's largest water-based company, has repeatedly been accused of handing out fat cheques to its shareholders, whilst there were constant complaints of poor water quality, numerous leakages over the years, and scandals that include dumping sewage into the Thames river [6]. It has attracted criticism from the government, with Labour Party leader Jeremy Corbyn stating his intent to bring the monopolist into public ownership [7]. Thames Water is reported to not reward any dividends until 2020 [8]. This isn't the first time a firm has taken undue and unfair advantage when it comes to a public utility. One may be reminded of how the now-bankrupt and forever tainted company Enron exploited the California electricity industry in extremely questionable ways to make huge profits. They held the power

plants in the state at ransom, puppeteering them at their will. Water investment is generally known to have substantial sunk costs, and no immediate, short-term returns, at least currently. One can see why it could be misused.

Moreover, one interesting argument about bridging the gap between private capital and decisions in public interest with respect to water supply is the idea that we now need to start accepting high costs of water. The 2016 Aspen-Nicholas Water Forum Report states this idea - that we need to normalize it within society and expect government-subsidized water to a lesser extent [9]. Prices should also be equitably set, depending on income levels. The very thought of accepting this idea should be some indication of how worse off we are when it comes to climate change and water scarcity. However, the same report also talks of a projected funding gap of $84 billion by 2020, that needs private capital to fill it. This article doesn't denounce participation of private entities either, but rather the direction in which it is heading.

On the other hand, one can see whether these private firms are really as efficient as theory suggests. Cases like in the Caribbean, Singapore, Saudi Arabia, and a host of African nations are making a compelling argument for privatizing public water systems. The Asian Development Bank released a paper in 2016, comparing the performance of private utilities/public-private partnerships against public entities in China - a country facing issues of both quality and quantity [10]. The paper makes note of lower managerial costs, higher labor productivity, lesser leakages, higher value added and revenue earned per employee, and better overall efficiency due to PPP, while also stating that these benefits magnify under majority private ownership. However, on the flip side, the paper also mentions that much of the improvement can be attributed to higher tariffs, which are also a cause for concern among Chinese citizens. Moreover, there were little to no enhancements in areas like service quality and water accessibility, and power consumption had increased significantly. China has been a case study longer than most nations, and considering the demographics and governance of the nation, it may not be far-fetched to apply similar results to other nations with similar characteristics. Privatization may not inherently be all rosy if we are talking about efficiency, either. It clearly comes at some cost, especially when an increase in water tariffs is not exclusive to this situation alone.

All this begs the question - what are the intentions of these corporations when they take over public property, and how ethical is this? The biggest consideration to make here is that we are ultimately putting a price on something that was meant to be free. We are handing over a resource essential for survival to firms that have betrayed our trust multiple times before. Sure, a lot of firms are doing it, so that might mean that competition could allow water to have a low price. But what happens when these firms set rules among themselves, as if they were colluding? Back in 2008, firms were complicit in handing out loans to those who couldn't afford the interest payments on them. Credit scores of people were botched by major institutions like Standard & Poor, Moody's, and Fitch, because if they did not do so, these same firms would not send them bank accounts to evaluate. What is to say that, much like a cartel, they would not set such unwritten rules that are otherwise hidden to the commoner? Tycoons like oil magnate T Boone Pickens, Warren Buffett and Hong Kong billionaire Li Ka-Shing have been scooping up water systems for 2 decades now [2][11].

The Bush family, a fact probably not known to many, owns what is possibly the biggest aquifer in South America [2]. The same people who may have failed us in public policy are probably now also saving the best for themselves. Scarcity creates an opportunity for profit, undoubtedly. Some of the most water-stressed nations include Qatar and Bahrain, and these are also places where the water ministry is willingly handing out the keys to private groups, like the Abdul Latif Jameel Group in Bahrain [12]. The idea that in the future, wars may be fought over water may not be such a distant possibility. If not wars, we may just have revolutions. In fact, there's also the extreme possibility of these very firms willing to exploit the needs of two parties in a water-related conflict, in the sense that the highest bidder would get the funds.

While bonds seem like an adequate alternative, there is no guaranteed way to ensure the completion of what the debt undertakes to service, except for The Green Bond Principles [13], which aren't set in stone, since every nation has its own norms anyway. Nor are the returns that high. However, companies like BlackRock and State Street have already launched their own products. Cape Town issued green bonds as an avenue to solve its own water crisis, and has had excellent creditworthiness so far. [14].

Yet another way in which one may invest in water is through investing in farmland or food that requires a lot of water. A very prominent case in recent years was the Harvard endowment fund buying vineyards, 6 years back in the name of a subsidiary company in Santa Barbara, California - a drought-stricken state [15][16]. The land was well connected to groundwater, for which the fund dug up wells. Neighboring citizens are worried that Harvard is not going to leave much for anyone else. As of 2018, the Wall Street Journal has reported that Harvard has been buying vineyards all over California [17]. One can't say if this is merely part of their strategy to gain tax-free profits and enrich the university; there is also a tingling sense that gives away their knowledge of what is to come in the coming years. Michael Burry himself reportedly made investments in almond farmlands after that year, since the dry fruit is a water-intensive food item [18].

What these farm investments also highlight is the prioritization of urban development over improving standards in rural areas, since city administrations, owing to reputation, growth potential, employment levels, and desirability to live in cities, can lobby for certain water rights harder than people in rural areas. Los Angeles was one such city back in early 20th century - the diversion of water from the now-arid Owens Valley created a conflict with the farmers in the valley that continued into the later part of the century [19]. The Indian government was accused of diverting water resources from farmers in Falla village in Gujarat to the town of Jamnagar, at a time of acute water shortage [20]. Governments around the world have been accused of displacing habitats in the name of developing dams and other forms of water infrastructure. Once they allow private entities to increase their stake in major water projects, these same governments shift their own accountability in the event that there is a conflict with regards to the common people.

India is seeing a surge in this trend of investing in water of late. The Economic Times recently reported how two India-based water infrastructure companies - VA Tech Wabag and Ion Exchange - have attracted the watchful eyes of investors on Dalal Street [21]. Investing maestro Rakesh Jhunjhunwala is reported to have around 8 lakh

shares in Ion Exchange. With metropolitan cities like Chennai, Delhi, and even Hyderabad being forced to control their water supply, we will be seeing more of these companies on the news. The government's "Nal Se Jal" scheme is reported to attract investments worth Rs 6.3 trillion.

It is still a little early to make conclusions about where all this can go. Investment banks have likely seen all this a mile away, and they have been amassing treasuries of funds to prepare for the worst and make it their best case scenario. What is alarming, however, is how these strategies can be applied to resources like clean air, that were previously thought to be infinite. Moreover, the rapidity with which climate change is consuming the Earth is accelerating when monied individuals and groups will take hold of vital commodities, possibly displacing communities in the run. Are we going to see any major regulations in this industry, where the opportunity for privatization also makes some public involvement a compulsion? Only time will tell.

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Q.1 What is your take on the Indian Budget with respect to the environment?

It is a good thing that they have cut the GST rates but it is not a strong enough policy. They need to do much stronger things than what they have done. There is the EV policy that was announced later- I think it came after the budget.

The problem here is that the auto industry is anyway going to say that 'one should go slow' with such policy changes. The reason why they are going to say that can be understood through an example. Suppose, you have made a capital investment in a factory and the expected life of the factory is 15 years. Then, the government comes up with a policy which says that since these vehicles are polluting, you have to stop making them in 5 years. Consequently, you are going to make less money out of that existing plant and it is expensive to redo it to produce a different kind of vehicle.

Therefore, you are either going to lose money or make less money. But if you take the argument at its face value, then you never make any environmental progress. Because it is always going to be cheaper to invest in a more polluting vehicle than investing to make a less polluting vehicle. So, the problem with all this media report about the difficulties with the EV policy is actually motivated by that.

It is the fundamental fact- you talk to any polluter about anything, they will always say that this is not a realistic approach. That people are going to lose jobs, etc. So the point is that for any kind of policy that the government puts into place, the important thing is to have a long term plan, announce it, and ramp it up. No stakeholder in the process wants to have big policy shocks. For example, everyone is merrily polluting and then one day, you want a big change. Now what has happened is that in the last 10 years, more companies have made investments with the assumptions that they will go on polluting and no one will say anything about it. So what you have done by not giving signals ahead of time, is that you have encouraged the industry to invest in polluting technologies. And, such capital investments are long-lasting.

Thus, any policy you want to do today, think about it for the next 10-15 years because that is the time horizon which the companies make when they are planning big capital investments. For instance, a company sets up a factory to produce automobiles which it has to pay over many years. So you need to send a signal today and a credible signal, not just cheap talk that policies are going to get tighter and tighter. However, it should start low and then ramp up. Because what that will do is that the industry will be warned ahead of time. Investing in polluting technologies will be risky since one may not be able to sell those things. That is the kind of signal you want to send.

But then again, there is always going to be the case of the industry lobbying against regulations. There is no way out of this dilemma- you have to take a stance somewhere. Because you can't say today that 10 years from now you will sell only electric vehicles despite knowing nothing of what will happen between now and the next 9 years. If you don't put some requirements into place this year, no one will take your announcement seriously. People will only take your announcement seriously if you show them that you mean business, and to show that you mean business you have to put in regulations that actually have some point. This is essentially the weakness of the Indian regulatory policy. We don't have a policy that looks at the long term sufficiently. The Indian policy is incomplete because the duty cut for EVs is not

enough. At the moment, the EVs are still much more expensive and to make them less expensive, you have to have production.

There is something known as a learning curve or an experience curve, and what that is- is that every time you double production, not just production but the cumulative production of any industry- be it coal firepower, solar power, washing machines, cars, trucks, railway engines, whatever it is- if you take cumulative output, then for every doubling of cumulative output, there is a percentage fall in the cost of production per unit. This percentage decrease can be estimated from the data, and it applies to every industry. The actual coefficient, i.e. by how much or what percent the cost falls for every doubling of cumulative production, varies from industry to industry. But it is a very predictable relationship in every industry. What this implies, basically, is that if you want to bring the cost of the technology down- in the case of non polluting technologies you want cost to come down as quickly as possible- you have to gain encouragement to increase output so that this learning by doing happens.

This was the reasoning behind India's National Solar Mission which started in 2010. What they did was that they said that they were going to procure solar PV energy even though it was 10 times as expensive as power from coal-fired plants. However, it is cheaper now. Why? Not only in India but worldwide, solar power was encouraged. There were government procurements that signaled that even though it was expensive, they would procure it and that moved the industry down the learning curve. In the case of solar PV, the learning Coefficient is quite high. There is around a 22% fall in cost for every doubling of the total volume of production. This is quite rapid, so the cost has fallen by about 80% in the last 5 years.

So now you have a situation in which non-polluting technologies are cheaper than the polluting technologies. Therefore, it is only a matter of time now before the old technology goes out. Why is it a matter of time now? Because as I said before, you have all these plants and equipment sitting there and they have lifetimes. You want to achieve the same for, for example, electric cars.

Q.2 Will the trade war affect this?

We have to understand that almost everything now is made in China. China is the big manufacturing giant of the entire global economy. You go to any shop in any country in the world and just look at how many things are made in China. This industry is no exception.

Q.3 How common Is it for the Indian government to have experts such as environmental economists for suggesting some policy changes or recommendations?

I don't think they have any clue about the environment. I am sorry to say this but they are not getting good advice on environmental economics.

Q.4 Do you think we have enough literature available on the Indian environment?

Yes, it is available, but there could be more. There is enough to make better policies than the ones we have now. But, of course, it is good to have more research because as the years pass you want to be able to use that research to make better policies.

Q.5 Then why do you think the government is going wrong? Why aren't they incentivized enough to approach experts?

I think the fundamental problem is that environmental pollution has only recently become a bigger issue. It has been only in the last 2-3 years that the media has picked up on it, especially focusing on Delhi.

What this reflects is that the general public is still not thinking about this much. They are not really concerned and if the level of concern and awareness in the general public is low, then this is not a very big issue in the minds of policymakers. Because at the end of the day, they pay attention only to public opinion. Until we have much greater awareness, we are not going to have a sufficient degree of concern in the government to invest. It is true that they will be better off doing it because the problem is that environmental issues are a build-up, it is not that today everything is clean and tomorrow it is dirty. It builds up all the time and you really want to have the capacity to monitor it, to detect it and to put in place regulations that gradually ramps up so that the problems never buildup, to begin with.

Suppose the government announces some light regulations but says that they are going to be tightened and tightened. Then you don't get all that dirt to begin with. That's the economically efficient and cheap way of dealing with the problem. But we don't do that. In fact, we do almost the opposite. We do nothing. Then after that, suddenly, you will hear a politician saying that you people have very bad habits, you should clean up. Then after that, people go to court. Then the courts come up with some extremely draconian rules which can't be implemented anyway.

Q.6 Suppose there is a genetically modified crop whose productivity is many times more relative to the existing varieties. On one hand, the environmentalists who have a normative viewpoint argue that in the long run, this new GM variety can result in the extinction of all other varieties and this is a dangerous situation because there is a chance that we may lose the crop altogether. On the other hand economists like Mukesh Eswaran and Ashok Kotwal argue that, a considerable increase in farm productivity results in the structural transformation of the economy which pulls people out of poverty. As an environmental economist, what is your policy approach to this?

GM crops are no different from other crops, so the environmental concern about GM crops is entirely bogus. It is complete fiction created by Greenpeace and some European branches of Greenpeace which they use for fundraising. They have scared everybody into thinking that it is dangerous.

So why do I say that there is no concern about GM crops? The reason is very simple. That when you do plant breeding which people have been doing for thousands of years. You do exactly the same with GM, the only difference is that with GM, you can do it much faster. For GM, you can take a gene from a bacterium, and insert it in

wheat or cotton. Now the point is that, if it was the case that the crop had some adverse effect, then you would've found it but you haven't.

There is a new thing called gene editing. With this, you don't have to get a gene from some other species and stick it in here. You can just speed up this process which people do on farms, they grow something, select two parent species and cross them so on and so forth. You can do the same thing with gene editing, except you can do it very quickly because you don't have to wait for any generation to breed it; you can just edit the genes.

Q.7 Can you tell us about your current research work?

I am working on a number of issues, such as- on the impact of high temperatures on labor productivity, the impact of high temperatures on wheat productivity, and on the effect of electric induction stoves on household air pollution.

Q.8 We also have heard that you are using Game Theory to model the effect of climate change. Is it true?

Well, I do use Game theory in my work. I have, in the past, worked on climate models of Game Theory but I am not doing anything on that right now.

Q.9 How important do you think is it to have researchers from multiple backgrounds in order to produce a good research study?

There is a lot of research in which, as an economist, I will not be able to say something sensible without consulting or working with someone from the concerned field. So what I told you about the GM- it has got nothing to do with my work. So yes, it is absolutely crucial.

Q.10 There are some scientists who believe that climate change is not driven by human beings. What is your take on that?

There aren't any scientists who believe that climate change is not caused by humans. There might have been some legitimate doubts of this 20 years ago but that was a long time back. Since then, that has not been the case. If someone is telling you that climate change is not caused by humans, then he or she is not a scientist. The uncertainty about this was resolved a long time ago.

Q.11 We have heard that many people working in the field of Climate Change have experienced mental trauma and depression. As someone who has been working in this field for more than three decades, have you had similar experiences if yes then how did you deal with it?

You have to not let yourself get depressed, that is all I can say because it is depressing. It is very scary but you have to be positive and try to make a difference. One of the things that I have learnt to do is to stop paying attention to all the misinformation and to just let it pass by. To make a difference, you don't have to give

up your car and adopt a bicycle or make any changes to your lifestyle. Making changes individually is insignificant and what matters is raising awareness. So if you make a change in your lifestyle, it should be in order to persuade others that it matters and that they should do something about it themselves not just in their own lives but by persuading the media and the government to regulate and the best form of regulation is pollution fee.

There are many ways of doing regulations but the first important thing is to want to do it in person and to persuade the government that they have to do it. The only way that they are going to be persuaded is when the public, in general, gets awareness. So it is very important to raise public awareness, raise media awareness, and campaign for the government to do something. But if some companies spend tons of money to show that climate change is not an issue and you have many other problems in life, then you will not go out on the streets campaigning against it. Often the scientific information does not get communicated to the public because there is vast propaganda out there.

Q.12 Do you have any advice for undergraduate students who are interested in the field of environmental economics because when we usually talk to students they are always confused about what they can do to make a tangible difference within 5 or 10 years from now?

You actually have a very strong incentive to do something about the environment because it is going to be bad unless things are done now. It is important for you to be politically engaged. Things are already pretty bad- you have seen the droughts, Chennai without water, and this is only going to get worse at an accelerating rate because the rate at which carbon dioxide concentrations are building up is increasing.

Forget about carbon dioxide concentration growth rate falling to zero, the growth rate is not even declining- it is increasing. Unfortunately, I am going to be around to see all of that but you are going to see a lot more. Unfortunately, people have no idea how bad it is going to get and how quickly. There is a book called 'The Uninhabitable Earth' by David Wallace-Wells. In the first part of the book he discusses the various impacts of climate change, you should read that and tell everybody you know about it.

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