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STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE
ISSN 2581-4931 (Print)

Shri Ram College of Commerce is well known for its academic excellence and dedicated approach towards dissemination of knowledge in the academic world. The college appreciates the role of research in education and is committed to developing an inclination towards research in both faculty and students. In this pursuit, the college has taken the initiative to launch a new Journal named 'Strides - A Students' Journal of Shri Ram College of Commerce'.

ABOUT THE JOURNAL

It is a double blind reviewed bi-annual Journal launched exclusively to encourage students to pursue research on the contemporary topics and issues in the area of commerce, economics, management, governance, polices etc. The journal provides an opportunity to the students and faculty of Shri Ram College of Commerce to publish their academic research work.

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Shri Ram College of Commerce is committed to upholding the high academic standards. Therefore, the Committee on Publication Ethics (COPE) follows a 3-Stage Selection Process while approving a paper for publication in this Journal. The policy is as follows:

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The research paper is to be typed on A-4 size paper with single line spacing. The complete length of the paper should not exceed 5000 words including endnotes and references. The font size should be 12 and font style should be Times New Roman.

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Endnotes should be serially arranged at the end of the article well before the references and after conclusion.

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The first letter of the caption for table, figure, graph, diagram, picture etc. should be in capital letter and the other words should be in small letter - e.g. Table-1: Demographic Data of Delhi, Figure-1: Pictorial Presentation of Population etc.

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Declaration

As part of the submission process, the student and mentor needs to declare that they are submitting original work for first publication in the Journal and that their work is not being considered for publication elsewhere and has not already been published elsewhere. Again, the paper should not have been presented in any seminar or conference. The scanned copy of duly signed declaration by the students and their respective mentors has to be emailed along with the research paper.

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Principal's Message

To achieve and promote excellence in research and publish quality academic as well as educational resources as guided by the Mission Statement of the College, Shri Ram College of Commerce had launched a Journal, "Strides- A Students' Journal of Shri Ram College of Commerce" on the occasion of 91st Annual Day of the College held on 13th April, 2017. The Journal was released by then the Hon'ble Union Minister of Human Resource Development, Shri Prakash Javadekar. The Journal publishes the research papers and articles written by students of the College under the mentorship of Faculty Members which go through an intense review mechanism before getting published.

Through the Journal, students get an excellent platform to enhance their research calibre, display their academic perspective, and practically apply their classroom learnings to real-world situations. The present Issue includes several multi-disciplinary and contemporary topics such as "Quantum computing: A futuristic frontier in the financial sector", "Unfolding the Global Hunger Index 2020", "Role of Monetary and Fiscal policies during Covid-19: India and Comparative Analysis", "An analysis of macroeconomic and bank-specific causes for burgeoning NPAs in India", "The political leaning paradox", and "Re-engineering climate change solutions through carbon credit trading".

I wholeheartedly congratulate the Editor, Strides, Dr. Rajeev Kumar and students whose research papers got published in Volume 4 Issue 1 & 2 of the Journal. Simultaneously, I encourage more students to contribute their research papers for the successive Issues.

My best wishes for your future endeavours!

Prof. Simrit Kaur
Principal

Editor's Message

Shri Ram College of Commerce is well known for its academic excellence and dedicated approach towards dissemination of knowledge in the academic world. The College acknowledges and values the role of research in education and is firmly committed to develop and encourage an inclination towards research in both faculty and students. To reaffirm this ethos, the College has taken the initiative to launch a new Journal named 'Strides - A Students' Journal of Shri Ram College of Commerce' to encourage students to pursue research under the guidance of the faculty of Shri Ram College of Commerce.

It is a bi-annual Journal launched exclusively to publish academic research papers and articles by the students on contemporary topics and issues in the area of commerce, economics, management, governance, policies etc.

In order to maintain high standards of publication, COPE (Committee on Publication Ethics) has been constituted. The COPE is the apex authority which authorises over all the decisions related to publication of research papers and articles in Strides. The recommendations and decision of COPE is final and binding.

To maintain high academic standards, academic ethics and academic integrity, a rigorous process of double-blind review of research papers is followed along with screening of plagiarism of each manuscript received by the COPE for publication. The research work published in Strides is absolutely original and not published or presented in any form at any other public forum.

The foundation issue of the Journal "Strides - A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17" was successfully released on 91st Annual Day of SRCC held on 13th April, 2017 by Shri Prakash Javadekar, Honb'le Union Minister of Human Resource Development, Government of India. The successive issues of 'Strides - A Students' Journal of Shri Ram College of Commerce' have been released bi-annually. However, due to the COVID19 pandemic and ensuing lockdowns the current issue has been delayed.

I congratulate all the students whose research papers are published in this issue of Strides and express my sincere thanks to their mentors and referees.

Dr. Rajeev Kumar
Editor

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STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE

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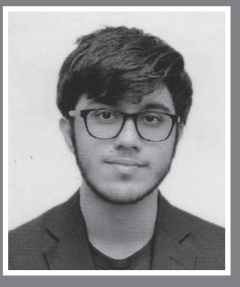
RESEARCH PAPERS

Quantum Computing: A Futuristic Frontier in the Financial Sector



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ABSTRACT

Quantum Computing is an emerging and disruptive technology impacting various sectors of the economy including finance. Unlike the present computers which work on bits that exist as either 0 or 1, quantum computers encode information as quantum bits that exist as a superimposition beyond those two states. This feature makes it way more powerful than today's supercomputers. In this context, the present paper discusses the concept of quantum computers, its extraordinary features that differentiate it from classical computers and examines the futuristic applications of quantum computing in various spheres of the financial sector such as banking, insurance, stock markets, and cryptocurrency. A comprehensive analysis is conducted to put forward several dimensions ranging from operational and routine applications such as fraud detection, data handling and processing, and risk profiling to advanced and sophisticated functions such as targeted prediction, Monte Carlo optimization, quantum bitcoin, trading optimization, and pricing of financial derivatives.

Additionally, a cross-country analysis is carried out with respect to their allocations and achievements towards Quantum Computing with a special focus on India's progress in this field. Quantum Computing is still at its nascent stage but has a promising role to play in the field of finance.

INTRODUCTION

With each passing day, millions of people around the globe are working tirelessly to enhance the fourth industrial revolution. It is a phase where all the boundaries between the physical, digital, and biological worlds become blurred. One of the elements that is believed to be crucial in bringing forth the true potential of the fourth revolution is Quantum Computing. In the 80s, scientists started considering numerical calculations from an entirely different perspective: using the intrinsic, quantum mechanical properties of matter to solve problems (Neilson and Chuang, 2002). This marked the conceptual birth of Quantum Computing. However, the true realization of quantum computing technology lies much ahead in the future and it is very evident that the first-mover advantages in this field will provide benefits in the long run. Therefore, several countries, both developed and developing are investing exorbitant amounts towards researching and developing quantum technology. Moreover, varied multi-national companies such as Google and Alibaba have set up separate research bases to try and unleash the technology's potential.

Quantum Computing has everlasting implications for all types of industries ranging from aerospace to health care and pharmaceuticals. Since money and finance remains at the core of most sectors in the economy, the quantum computer's true potential lies at the centre of the financial industry. Let us first discuss the difference between classical and quantum computers to understand the applications of Quantum Computing. The component which is at the core of a classical computer is a processor. The processor is made up of numerous small components called transistors. A computer is made of billions and trillions of transistors and they play the indispensable role of a switch to stop and facilitates flow of electricity. Historically, the size of the transistor has been reducing over the years leading to twin benefits of increased computing power and less energy consumption leading to better

efficiency. Currently, the scale of transistors lies between 10-20 nanometres and is expected to further shrink in the coming years. Consequently, the size of the transistors is believed to mirror the size of an atom. At this stage owing to a concept known as quantum tunnelling, the transistor will become incapable of doing what it was essentially made for that is stopping and letting electrons (electricity) pass. This will become an unsolvable problem for classical computing. Thus, comes the role of quantum computing into the picture which not only overcomes the above-mentioned problem but uses it to its advantage. In classical computers, bits are the smallest units of information and are represented by 0 (low charge) and 1 (high charge). Quantum computers use qubits whose value is entirely probabilistic and can be in any proportions of 0 &1 (known as superposition). This results in an exponential increase in its power as a qubit can function both like 0 or 1 bit. Four classical bits can be in sixteen (24 = 16) different configurations out of which only one can be used at a time. Four qubits in superposition, however, can be in all of those 16 combinations at once. This number of combinations increases exponentially by simply adding more qubits. For example, only 20 qubits can store a million values in parallel. Quantum entanglement is another feature through which actions performed on one qubit affects another entangled qubit no matter how far apart they are. Hence, a quantum computer sets up some qubits, applies quantum gates to entangle them and manipulate probabilities, then finally measures the outcome, collapsing superpositions to an actual sequence of 0s and 1s. This implies that unlike a classical computer, we can get the entire lot of calculations that are possible with the setup, all done at the same time.

This will increase the efficiency and effectiveness of data classification, IT security, simulations and machine learning. Table 1 showcases the Quantum Computing developments over the years.After the brief introduction in Section 1, Section 2, provides a detailed explanation of varied applications of quantum computing in financial sector. In Section 3, we examine the quantum efforts made by countries worldwide with a deeper focus on India. Finally, in Section 4, we conclude and discuss the policy implications

Table 1: Timeline of developments of Quantum Computing

May 1981	Richard Feynman proposed the idea of quantum phenomena to perform calculations. In a speech at the First Conference on the Physics of Computation at MIT, he suggested a simple method for a quantum computer.
March 1984	At the university of Oxford, David Deutsch wrote a paper which gave a description of a first ever universal quantum computer and suggested similarity in operation of logic gates in both quantum and traditional computers.
March 1994	In New Jersey, Peter Shor discovered what is known as Shor's algorithm. This algorithm allows a quantum computer to give factors of a large integer very quickly, and could hence break various cryptosystems used today.
Jan 1996	Lov Grover discovered what is known as the Grover's algorithm. This algorithm allows a quantum computer to search an unsorted database at a much way faster speed than a classical computer.
May 1998	First 3-qubit Quantum Computer built by scientists at MIT and the University of Waterloo
August 2000	First 5-qubit Quantum Computer built by IBM on which Shor's algorithm was also partly demonstrated
November 2000	First 7-qubit Quantum Computer built at Las Alamos National Laboratory in New Mexico
December 2001	IBM fully executed Shor's Algorithm with a 7 qubits computer. The Seven-qubit machine found the factors of the number 15. Although the answer may appear to be trivial it was the most complex quantum computation performed till then.
December 2005	The first qubyte was created at the University of Innsbruck in Austria. An entanglement of eight quantum was observed, yielding a qubyte.
May 2006	First 12-qubit Quantum Computer built at Institute for Quantum Computing, Perimeter Institute for Theoretical Physics and MIT. The team's inferences set a new algorithmic benchmark to utilize quantum properties I order to support entirely new modes of information processing.
November 2007	World's first 28 qubit Quantum Computer demonstrated online at Supercomputing 2007 conference by D wave
June 2009	Yale university created solid state quantum processor. It was an achievement because before this scientist didn't manage to get a qubit to last longer than a nanosecond, but the Yale qubit lasted a microsecond.
June 2011	D-wave company announces a 10-million-dollar commercial quantum computer with a 128-qubit chipset that performs task known as discrete optimization. However, scientists worldwide have criticized the same because of lack of demonstrations.
March 2012	Caltech physicist John Preskill describes the moment when "well-controlled quantum systems can perform tasks surpassing what can be done in the classical world" as the arrival of "quantum supremacy"
November 2017	IBM reveals its working prototype of 50 qubits Quantum Computer which was earlier considered to be the threshold of 'Quantum Supremacy'.
October 2019	Google claims the achievement of 'quantum supremacy'. The company claimed the quantum processor Sycamore was able to perform a specific task in 200 seconds that would take the world's best supercomputer 10,000 years to complete however remains contradicted by IBM

Source: Time toast, 2020

Application of Quantum Computing in Finance

Quantum algorithms hold the potential to provide prodigious speedups to the way several activities are carried out today in the financial world. This speedup is known as quantum speedup and can be used to improve and

carry out various algorithms that were not possible on traditional computers. In this section, we throw some light on the problems faced by the financial sector and how Quantum Computing technology can help to overcome them. We have divided our discussions into four components of financial sectors namely, Banking, Insurance, Financial Markets, and Cryptocurrency.

Banking and Insurance

One of the most important roles that banks and insurance companies as intermediaries play is that of customer data storage and handling in order to optimize the user experience. However secondary the task of data management for a large-scale bank may seem, it is very hard and requires sophisticated technology. This can be illustrated by data breach events of Bank of America in 2005 with 12,00,000 records compromised, Compass Bank in 2007 with 10,00,000 records leaked, European Central Bank in 2014, and the list goes on. The same was witnessed in India as well. In 2016, major banks including SBI, HDFC Bank, ICICI, Yes Bank and Axis Bank witnessed a gigantic data breach with over 3.2 million debit cards used for foul-play. According to research conducted by Juniper Research, over 146 billion records are expected to be lost to cybercriminal attacks between 2018-2023 worldwide.

Therefore, the world's largest banks including Barclays and JP Morgan chase are shifting their outlook towards quantum computing for strengthening the security of databases with key customer and transaction details. Better data management helps such institutions withstand periods of vulnerability and financial crashes as well (Trehan, 2019). In the realm of quantum computing, the concept of quantum encryption is set to play a major role in data protection in the coming years. Quantum encryption sends data over quantum networks and uses a set of the system known as Quantum Key Distribution (QKD). QKD ensures encrypted messages and their keys are sent separately and if either of them gets tampered during transmission, they both get destroyed automatically. Combining quantum encryption with blockchain technology will create arguably the most hack-proof technology in the Internet of Things (IoT) era.

Quantum computing because of its sheer dominance in processing information also presents a once in a lifetime opportunity for banks and

insurance companies in terms of transaction speed. With an all-time surge in internet penetration rate due to Covid (currently 59% worldwide) and pro-active efforts of the government around the world to strengthen the banking system, it is apt to mention that the number of unbanked adults (1.7 billion) is set to go down in the future. This in turn would lead to more transaction traffic for banks. Quantum computer's ability to handle billions of transactions per second will help banks meet that traffic more efficiently than present-day technology. Just like Quantum Encryption combined with blockchain present the opportunity for hack-proof transmission, Quantum Computing powered by Artificial Intelligence (AI) will help banks and insurance companies automate decision making to a large extent. Therein ridding the banks of many operational technicalities like approval of bank mortgages and loans, project profitability measurement, better-consulting services for clients, etc. (Cag, 2020).

Artificial intelligence and Machine Learning are finding their way into majorly all spheres of life with greater acceptance. This is illustrated by its heavy influence in services provided by Siri, Alexa, Netflix, Pandora, Amazon.com, Tesla, etc. Google's current CEO once stated that AI and Quantum Computing are best placed to shape the tech industry in the years to come. We are all familiar with the ability of Quantum Computing to process enormous chunks of information in a short time. This ability can provide artificial intelligence machines with the feedback required for them to improve their performance, and subsequently, shorten their learning curve (bobsguide, 2018). However, the error rate is very high relative to current technology standards and will have to be improved drastically to impressively harness quantum computers. This ability of quantum computers to process large quantities of data means that they would provide artificial intelligence machines with the feedback required for them to improve their performance, and subsequently, shorten their learning curve (bobsguide, 2018). Mentioned below are some ways through which Quantum AI will empower banks and insurance companies:

Personal Assistants and Chatbots: In the times to come, Chatbot is expected to become a force to be reckoned with. Chatbots can save up to 30% in Customer Support Costs and 90% of the banks' interactions are expected by customers to undergo some sort of Chatbot automation by the end of 2022

(Chatbot Magazine, 2017). Quantum AI has the ability to undertake at the same time billions of personalized conversations recommending billions of personalized products, thus providing far superior customer service and cost reduction.

Mobile Banking and Personalised planning: Nowadays people especially millennial rely heavily on the internet to manage their finances. Quantum AI can meet the user's needs with great precision using personal, contextual, and predictive services and thus provide a great advantage over banks.

Automated Recruiting: We have seen how recruiting has also come under the ambit of AI and how companies like Unilever, PwC, Vodafone, and Oracle have used the same. Adding quantum computing to the mix will open a plethora of opportunities in terms of more sophisticated criteria setting, better body language judgement, better internal skills inventory management and much more.

Big Data Analytics: Big data analytics is also being increasingly used in various fields like hospitality, government and public sector services, energy, education, etc. Talking specifically about banking and insurance, big data combined with quantum computing will speed up transactional activities and grouping of seemingly incongruent assets. Getting even more specific, Quantum Big Data Analytics will prosper in segments discussed next:

Efficient Profiling of customers: Customer segmentation helps banks to classify their customers by demography. However, it does not possess the granularity to enable them gain meaningful information regarding their needs and wants. Using big data and quantum computers, banks and insurance companies will get the relevant data for billions of customers such as the customer's demographic information, number of accounts and products they have, offers they've declined in the past, products they're likely to purchase in the future, major life events, their relationship with other customers, attitude toward their bank and the financial services industry as a whole, behavioural patterns and service preferences.

Opportunities for upselling and cross-selling: Businesses are 60%-70% more likely to sell to existing customers than they are to prospective customers.

This translates to great opportunities for upselling and cross-selling using quantum big data analytics. For example, if some bank in collaboration with Indigo launches credit cards on attractive terms for Air travel, it would have been challenging to first create a database of prospective customers and then marketing the same. However, with quantum big data tools, no matter whatever be the size of customer information, it will be easier for employees to spot favourable user tickets on which marketing techniques can be built.

Fraud Detection: There have been 650572 cases of identity threats alone in the US in 2019 (The Ascent, 2020) of which around 40% are credit card thefts. Along with this insurance frauds are also on the rise. It is discovered that out of 10 billion global online transactions from September 2018 to September 2019, 9.14% were found to be risky in the insurance industry compared to 5.09% across all industries (Insurance Post, 2020). Estimates show that financial institutions are losing between USD 10 billion and 40 billion in revenue a year due to fraud and poor data management practices. Fraud detection systems are highly inaccurate showing 80% false positives, causing financial institutions to be highly risk-averse. If proper credit scoring needs to be done, it can take as long as 12 weeks, for which most of the customers may not be willing. (IBM, 2020). Quantum computers can support highly effective pattern recognition algorithms, helping to detect even more sophisticated acts of fraud. This way, it can result in large cost reductions, prevent companies from losing genuine customers, and support the IT infrastructure of these institutions (Ben Rossi, 2016).

Workplace Improvements: We live in a time where employer branding is given a lot of importance by the employee supply in the market which has in turn been magnified by the pandemic. So, it has become increasingly important for banks and insurance companies to look after employee needs at all levels as in Maslow's Need Hierarchy Theory. Big data analytics powered by Quantum Computing will help said companies maintain even hourly data of performance metrics, assess employee feedback, work culture trends, and possible future conflicts.

Stock Markets

Quantum computing's specific use cases for stock markets can be classified into three main categories: targeting and prediction, trading optimization, and risk profiling discussed hereby.

Targeting and Prediction: As the number of firms providing financial services is increasing, their customers are also demanding more personalized products and services that can rapidly anticipate their evolving needs and behaviours. 25% of small and medium-sized financial institutions lose their customers because of failure to provide services up to the customer's satisfaction. The task of creating analytical models that can sift through mounds of behavioural data quickly and accurately is near to impossible with traditional computers. Quantum computing can be a game-changer for customer targeting and prediction modelling. For instance, in 2019, Google was believed to achieve 'quantum supremacy' with its Sycamore Quantum processor for solving a calculation in 3 minutes 20 seconds that would have otherwise taken approx. 10000 years if done by a supercomputer. (The Financial Times, 2019).

Trading Optimization: Financial markets are known is their complexity. Every investor seeks to maximize his returns on his investments, but there are millions of combinations possible in making a portfolio, making it impossible for the traditional technology to decipher the best combination of assets and their weights due to the computational limitations and transaction costs. For example, Multiverse Computing, a startup working on Quantum computing technology over the course of a year, tried to find the most profitable mix from a group of 50 assets, subject to restrictions, such as how often trades could be made. The result was a problem with around a whopping 101,300 possible solutions (The Economist, 2020). Quantum computers along with the market volatility can take into account customer life-event changes, into portfolio optimization. This technology has the potential to cut through the challenge of complexity and help the financial service providers in portfolio diversification, rebalance the portfolio considering the market changes and reduce the cost of the trade settlement process.

Risk Profiling: Financial service institutions are regularly asked to improve their present methods of balancing risk, hedging positions, and perform a wider range of stress tests to comply with regulatory requirements. Liquidity management, derivatives pricing, and risk measurement can be complex to calculate. Quantum computers can quickly solve problems that are encountered in algorithmic trading with speeds that are increasing exponentially, rather than linearly. For instance, IBM developed a quantum

algorithm that can estimate the risk of portfolios of financial derivatives. Classical Monte Carlo needs millions of samples to get a reasonable accuracy, whereas, with the quantum algorithm, risk can be reduced significantly.

Monte Carlo Quantum Methods: While using Monte Carlo methods, the required number of simulations become very large if the purpose is to obtain the most probable outcome. However, combining the Quantum algorithm with the Monte Carlo method can give a near quadratic (or power 2) quantum speedup over classical algorithms (Montanaro, 2015) even in stock market simulations.

Pricing of Financial Derivatives: The payoff in financial derivatives contracts depends on the future price paths of some underlying asset. Brokers must know what should be the fair price value of the derivatives on the basis of the state of the market. This is a pricing problem, which can be solved with Monte Carlo simulations. But the growing number of derivatives have resulted in high computational cost and lengthy execution times. A quantum Monte Carlo simulation can tackle this problem effectively (Quantum World Association, 2018).

Crypto currency

Bitcoins are accorded as one of the safest and highly encrypted form of money storage. That is the biggest reason for them being so expensive. But quantum technology provides a possibility to take control over this blockchain technology. Theoretically, a 4,000 qubit quantum computer could crack bitcoin and most of the other crypto currency's encryption in a matter of seconds, whereas even a super computer might take 1000s of years to do the same. (Robert Stevens, 2020). One can possibly credit their account with free bitcoins or prevent someone from making transactions. Hackers can derive the private key used to sign transactions from the public keys exposed during transactions. The vulnerability that the cryptosystem is surfaced to is due to shortcomings such as Exposed Public Key (Anastasia Marchenkova, 2019), reusable wallet addresses, fast enough attack, and possibility of Lost Coins (Anderson, 2017). However, quantum bitcoins can offer various advantages such as faster transactions, high scalability, anonymity, free

transactions and better predictability (Jogenfors, 2019).

CROSS-COUNTRY DEVELOPMENTS IN QUANTUM COMPUTING

Quantum computing is all set to revolutionize the world and become the face of tomorrow's technology. The following countries have illustrated the same by initiating humongous and innumerable projects over the last few decades to better position themselves in this upcoming disruptive wave as depicted by figure 1 below:

Figure 1: Worldwide Allocations in QC

(*Summary of world programs' outlay towards building Quantum Technology in the past decade ($ million))*

U.S. has always been at the top of the race of developing Quantum Computing technology. One of the major reasons being contribution from its "Big Tech" companies, i.e., Google, IBM, and Microsoft, which are making significant efforts to develop this technology. In 2018, IBM secured more patents than any other US company (most of the patents being in the field of artificial intelligence, quantum computing, and blockchain). Google recently achieved quantum supremacy, solving a problem in 200 seconds which would have taken 10,000 years for a classical computer to solve. Microsoft has developed Q#, an open-source programming language, which they will use

to develop and run quantum algorithms (Inria, 2020). In December 2018, U.S. Former President Trump signed H.R. 6227, to fund a bipartisan act, i.e., the National Quantum Initiative Act (NQI). Research and development in quantum technology were made a national priority. Through this law, the government has dedicated $1.2 billion towards the development of quantum information processing over the course of a decade.

China is not far behind in this race to the U.S. The country on its way to trying to become the world's new superpower has shifted its focus extensively towards quantum computing. China made quantum technology a key priority in its 13th five-year plan (2016-2020) and the Made in China 2025 plan. In 2017, China announced to build a 92-acre National Laboratory, costing $10 billion for quantum information sciences. When executed, it would be the world's largest quantum laboratory. This center has a huge potential to become a global hub for quantum research and a hotspot for future quantum research talent. Like the U.S, Chinese tech giants are also investing a lot of R&D in this field. In, 2015, Alibaba set up its own QC laboratory to produce a 50 to 100 qubit quantum prototype by 2030. It has also invested $15 billion in artificial intelligence, FinTech, and quantum research. Meanwhile, Baidu in March 2018 announced the creation of a quantum computing institute, and in the same year, Tencent established the Tencent Quantum Lab for scientific research in quantum computing (Inria, 2020).

Canada has invested roughly a sum of $1 Billion dollars over the past decade and is characterized by a growing private sector, exemplary research expertise, and immense government support to innovations. Canada was also ranked fifth in annual quantum research spending according to a survey (The Economist, 2017). Several institutions in Netherlands are leaders in fields like quantum Internet, quantum algorithms, and post-quantum cryptography. A total commitment of around $150 million has been made towards QuTech, quantum technology of TU Delft (Delft University of Technology) and TNO (Netherlands Organisation for Applied Scientific Research) (CISRO, 2019).

In Russia, quantum research is supported by both the government and industrial entities. The Russian government in 2019 invested around $663

million for the next five years into basic and applied quantum research carried out at leading Russian Laboratories with a focus on Quantum Computing and Quantum Simulation, Quantum communications, Quantum metrology, and sensing and enabling technologies (Nature, 2019). In South Korea, investments of $39.7m and $11.9m are made for developing core QuTechnology and research base over 5 years and ultra-high-performance computing knowledge data, convergence, system software, software engineering, information, and intelligence systems, and HCI (Human-Computer Interaction). In Japan, the total investment made in Quantum science and technology is around $280 million and has been made by players like Japan Science and Technology Agency, the Cabinet Office of the Government of Japan, etc. (Yamamoto, Sasaki and Tekesue, 2019). For example, the Japanese Govt. launched the Q-Leap in 2018 to invest in quantum simulation and computation, quantum sensing and Ultrashort pulse lasers. The Moonshot project is expected to invest around ¥15-20 to create a fault-tolerant universal quantum computer by 2050.

Australia has invested AU$130 million through federal funding and state-level investments in QuTech Development. (IOPScience, 2019) In 2017, two new quantum-focused Centres of Excellence were established as five-year programs: The first centre is FLEET (Future Low-Energy Electronics Technologies) located in Monash University and the second centre is Exciton Science located in the University of Melbourne.

Singapore in 2007 developed a Centre for Quantum Technology that enlists physicists, computer scientists, and engineers to conduct elementary research on quantum physics and to build devices based on quantum phenomena (Techinasia, 2019) Since then 2000 scientific papers have been published, researchers have won S$40 million in grants and established start-up companies and over 60 students have trained PHDs in QuTech. The overall quantum expenditure done in the past 5 years in the country is about S$150 million. The European Commission allocated €1b of funding over 10 years to launch the European Quantum Flagship in 2018 with the main aim to consolidate and expand European scientific leadership and excellence in this research area in order to kick-start a European industry in quantum technology. France has been investing 60m € in quantum technologies every year. The French government in 2020 launched a plan to structure a national

strategy for quantum technologies and estimated they would require 1.4b € over the next five years to fund quantum research. The strategic recommendations included creating an effective environment for innovation, delivering a tailored economic security strategy and establishing effective governance. In January 2021, French President Emmanuel Macron announced a five-year investment plan worth $2.2b in quantum technologies (Lemonde, 2021).

Indian Context:

In India, the Indian Institute of Science has a dedicated research area for quantum technology. It explores many areas like superconducting qubit devices, single-photon sources and detectors for quantum communications, integrated photonic quantum networks, and quantum sensors (Indian Institute of Science, 2020). In 2020, Indian government introduced an NM-QTA (National Mission on Quantum Technologies and Applications) with a total budget of INR 8000 crores (approximately $1b) over a five-year period. The top institutes that are currently offering education on Quantum Mechanics in India are, Tata Institute of Fundamental Research (TIFR); the International Center of Theoretical Sciences (ICTS); IISER Pune; IISc, and IIT Kanpur (Misal, 2018). From a national security perspective, there are 2 threads for global efforts. First, to build a quantum computer capable of decrypting secrets of other countries. Second, to build one's own communication hack proof and secure from the upcoming quantum technology. The ministry of Electronics and IT is interested in computing aspects; Defence Research and Development Organization (DRDO) in encryption products and, ISRO in satellite communication.

All these initiatives may sound good in isolation, but when compared with other countries, India lags far behind in the Y2Q ("years to quantum") race. But what are the reasons behind this state of being? First, India doesn't have a considerable number of workforce engaged in the field of quantum technology i.e., only around 100-200 researchers. A lot of Indians who are engaged in this field are working abroad in the companies like IBM and Google. Secondly, there's a lack of coordinated efforts. There are many researchers working in isolated communities on various aspects: quantum hardware, quantum key distribution, information theory, and other fields. The

complexity of this technology demands many kinds of expertise under one roof instead of the minimal communication that is currently happening amongst them. Third, India being strong on theory but weak on hardware. According to experts, lack of research is not the impediment to prepare for a quantum future, but the lack of infrastructure to carry that research out is. However, Indian Government has also identified this gap and is working towards it. Finally, where the private sector and big corporates are playing a major role in Quantum technology development in other countries, India's private sector and investors have not yet initiated efforts. Till date, the progress has been made only by the Government, but there is a need for big players like Wipro and Infosys to step in (Bansal, 2020).

CONCLUSION

The present paper elaborates the role of quantum computing in the area of finance. It is developing at a striking rate due to numerous leaps taken in its hardware development and in expansion of its conceptual theory. Unlike the present computers which work on bits that exist as either 0 or 1, quantum computers encode information as quantum bits that exist as a superimposition beyond those two states. This feature makes it way more powerful than today's supercomputers.

In this context, the present paper discusses the concept of quantum computers, its extraordinary features that differentiate it from classical computers and examines the futuristic applications of quantum computing in various spheres of the financial sector such as banking, insurance, stock markets, and cryptocurrency. A comprehensive analysis is conducted to put forward several dimensions ranging from operational and routine applications such as fraud detection, data handling and processing, and risk profiling to advanced and sophisticated functions such as targeted prediction, Monte Carlo optimization, quantum bitcoin, trading optimization, and pricing of financial derivatives. Additionally, a cross-country analysis is carried out with respect to their allocations and achievements towards Quantum Computing with a special focus on India's progress in this field. Several countries are performing outstandingly in this race of reaching quantum supremacy including India. It is certain that financial sector would be one of the biggest beneficiaries when quantum computers reach the

expected level of growth. But to fully harness the power of QC a lot needs to be done. There is an urgent need to increase the quality of the qubits and identify a reliable means to control and perform various sophisticated activities as described in the paper. Environmental factors (such as air, noise, and heat) also are a cause of concern for the qubits to maintain the superposition that is delicate and fragile (Philip Ball, 2018). Hopefully the challenges would be addressed in years to come demonstrating a promising role of QC in the field of finance.

REFERENCES

- American Journal Of physics. (2002). Quantum Computing and Quantum Information, Retrieved from: https://aapt.scitation.org/doi/abs/10.1119/1.1463744?journalCode=ajp

- Anastasia M. (2019). When can a quantum computer destroy bitcoin?, Retrieved from: https://www.amarchenkova.com/2019/09/13/quantum-computer-bitcoin/

- Ashley Montanaro. (2015). Quantum speedup of Monte Carlo methods, Retrieved from: https://sci-hub.se/https://doi.org/10.1098/rspa.2015.0301

- Ben Rossi. (2016). Information Age, How quantum computation will be a goldmine for the financial world, Retrieved from: https://www.information-age.com/how-quantum-computation-will-be-goldmine-financial-world-2-123460756/

- Bernard Marr. (2017). 6 Practical Examples Of How Quantum Computing Will Change Our World, Retrieved from: https://drive.google.com/file/d/1gk9_Cf-ml0BaUX0BjVBTYFhdp-QJ19g9/view

- Bobsguide. (2018). 7 areas in banking ripe for quantum computer disruption, Retrieved from: https://www.bobsguide.com/guide/news/2018/Jul/27/7-areas-in-banking-ripe-for-quantum-computer-disruption/

- Cag. D. (2020). Richtopia, Future use cases for of quantum technology in

Financial Services. Retrieved from: shorturl.at/lvKW7

- Chatbot magazine. (2017). Can Chat bot help reduce customer support costs by 30%, Retrieved by: https://cutt.ly/njSs3Qu

- CISRO. (2019), Quantum Technology Discussion Paper: Appendices, Retrieved from: https://outlook.stpi.narl.org.tw/pdfview/4b11410071743d5f01717b83ce980746

- Disha Misal. (2018). Top 5 Institutes For Quantum Mechanics In India, Retrieved from: https://analyticsindiamag.com/top-5-institutes-for-quantum-mechanics-in-india/

- IBM. Applying emerging quantum technology to financial problems, Retrieved from: https://www.ibm.com/thought-leadership/institute-business-value/report/exploring-quantum-financial

- IBM. Exploring quantum computing use cases for financial services, Retrieved from: https://www.ibm.com/thought-leadership/institute-business-value/report/exploring-quantum-financial

- Indian Institute of Science. Initiative on Quantum Technology (IQT@IISc), Retrieved from: https://www.iisc.ac.in/initiative-on-quantum-technologies/

- Inria. (2020), Who are the main players in the world in Quantum Computing, Retrived from: https://www.inria.fr/en/quantum-computing-main-players

- Insurance post. (2020). Insurance Fraud trends to look out for in 2020, Retrieved from: https://www.postonline.co.uk/claims/4580551/blog-insurance-fraud-trends-to-look-out-for-in-2020

- IopScience. (2019), Charting the Australian quantum landscape, Retrieved from: https://iopscience.iop.org/article/10.1088/2058-9565/ab02b4/pdf

- Jonathan J (2019). Quantum Bitcoin: An Anonymous, Distributed, and Secure Currency Secured by the No-Cloning Theorem of Quantum

Mechanics, Retrieved from: https://sci-hub.se/10.1109/BLOC.2019.8751473

- Kaemingk. D. (2018). Reducing customer churn for banks and financial institutions, Qualtricsxm, Retrieved from: https://www.qualtrics.com/blog/customer-churn-banking/

- Mark Anderson. (2017). qBitcoin: A Way of Making Bitcoin Quantum-Computer Proof?, Retrieved from: https://spectrum.ieee.org/tech-talk/computing/networks/qbitcoin-making-bitcoin-quantumcomputer-proof

- Muddu.V. (2019) Quantum Computing in Banking, The Indian Banker, 7(3), 36. Retrieved from: https://sbi.co.in/documents/2182813/4777159/Quantum+Computing+in+Banking_Indian.pdf

- Nature. (2019), Russia joins race to make quantum dreams reality, Retrieved from: https://www.nature.com/articles/d41586-019-03855-z

- Philip Ball. (2018). The Universe Is Always Looking, Retrieved from: https://www.theatlantic.com/science/archive/2018/10/beyond-weird-decoherence-quantum-weirdness-schrodingers-cat/573448/

- Quantum World Association. (2018). Quantum Computing and Finance, Retrieved from: http://quantumwa.org/quantum-computing-and-finance/

- Robert Stevens. (2020). Quantum computers could crack Bitcoin by 2022, Retrieved from: https://decrypt.co/28560/quantum-computers-could-crack-bitcoins-encryption-by-2022

- Samarth Bansal. (2020). Why India is falling behind in the Y2Q race, Retrieved from: https://www.livemint.com/technology/tech-news/why-india-is-falling-behind-in-the-y2q-race-11579018170008.html

- Statista. (2020).Global Digital Population as of October 2020. Retrieved from: shorturl.at/dqvK

- Techinasia . (2019), A new wave od quantum tech startups from Singapore hopes to make a mark, Retrieved from: https://www.techinasia.com/wave-quantum-tech-startups-singapore-hopes-mark

- The Ascent. (2020). Identity Thefts and Credit card Fraud Statistics for 2020, Retrieved from: https://www.fool.com/the-ascent/research/identity-theft-credit-card-fraud-statistics/

- The economist. (2002), Quantum Devices, Retrieved from: https://www.economist.com/technology-quarterly/2017-03-09/quantum-devices

- The Economist. (2020), Wall Street's latest shiny new thing: quantum computing, Retrieved from: https://www.economist.com/finance-and-economics/2020/12/19/wall-streets-latest-shiny-new-thing-quantum-computing

- The Financial Times. (2019). Google claims to have reached Quantum Supremacy, Retrieved from: https://www.ft.com/content/b9bb4e54-dbc1-11e9-8f9b-77216ebe1f17

- Trehan, R. (2019). QC and Banking Sector, Quantaneo, Retrieved from: https://www.quantaneo.com/Quantum-Computing-and-the-Future-of-Banking_a148.html

- Yamamoto, Sasaki and Tekesue. (2019), Quantum information science and technology in japan, Retrieved from: https://iopscience.iop.org/article/10.1088/2058-9565/ab0077

Effects of Covid-19 on the Travel Industry

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ABSTRACT

As an outbreak of a virus in Wuhan province of China has led the world face several challenges simultaneously in terms of good governance, health infrastructure, unpreparedness for disasters and more. As the declaration of the virus as a pandemic disease, it is likely to cause acute, short-term fiscal shocks, and long-term damage to economic growth. Travel sector being one of the most affected sectors by the pandemic is unlikely to recover early because the post-recovery period depends on the level of hysteresis and institutional efficiency in facing critical events. Studies show epidemic crises affect tourism demand differently as the impact of SARS (2001-2004) had an important impact on travel industry of countries as compared to the impact of Avian flu (2002-2006). But covid-19 pandemic being different, poses different challenges for travel sector globally making its recovery difficult. The global economic impacts of the pandemic are yet to be understood, but there is a unanimous agreement of a global recession due to the pandemic especially in tourism and hospitality sectors.

Keywords: COVID-19, Pandemic, Travel industry, Airline Industry, Cruise Industry, Car rental Industry, Hotel Industry.

INTRODUCTION

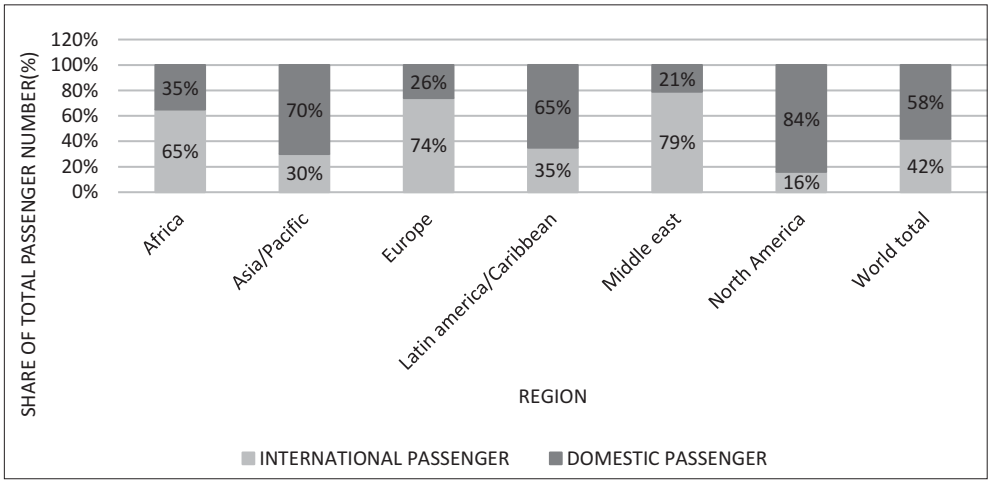
The arrival of corona virus made the world face unprecedented situations in terms of health emergency, lockdowns, travel restrictions and many other prohibitions. The outbreak affected numerous sectors and ultimately the global economy as a whole. One of the impacted sectors/industries include Travel industry, even after enjoying a prominent position in world's economy, the same faced many challenges posed by the pandemic and followed up by travel restrictions and cancellations. The pandemic has caused a lot of damage to the industry and may take years to recover from the damage and get back to normal levels. To gauge the impact of corona virus on travel industry, it is divided into four major sub sectors so that overall impact can be analyzed without many complexities. In this research, to assess the expected fallout we have taken into account major sub sectors of the travel industry - airlines, hotels, cruise lines and rental cars - as a path to gauge how pandemic has affected the travel industry. The paper is divided into separate sections dealing with the impact on each of the sub sectors, then followed up by conclusion.

Impact of corona virus on Airline Industry

The most important difference of COVID-19 disease from other diseases is that it spreads very quickly. It spreads easily between people in close contact or through coughs and sneeze. Countries take many measures due to the high rate of virus spread among people. The well-known measures are flight restrictions to certain countries, gradually expanded to suspending all flights and prohibiting foreign national's entry, 14-day isolation, and symptom monitoring for those that came from countries under risk. As the arrival of corona virus led to worldwide restrictions on the movement of people from one place to another neither only the prohibitions affected travel industry as a whole but also aviation sector too faced numerous challenges. According to the UNWTO tourism highlights the share of air travel has increased from 46% in 2000 to 59% in 2019, while land transport has decreased from 49% to 35% in the same period. As an evident position being enjoyed by airline industry

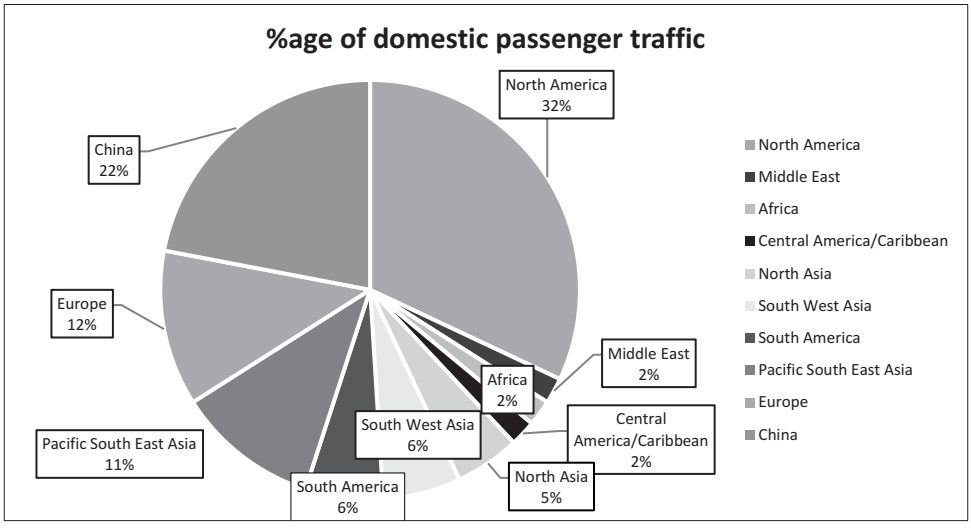
globally, the outbreak of corona virus followed by travel and flight restrictions all over the world changed the behavior of passengers, travel restrictions and the ensuing economic crisis have resulted in a dramatic drop in demand for airline services (International tourist arrivals (overnight visitors) plunged by 74% in 2020 over the previous year).

Before coming to the state of the post pandemic airline industry it is important to gauge its pre pandemic performance and trends. As tourism directly affects the airline industry, a recent report by UNWTO highlights that 2019 was another year of strong growth, though international arrivals grew below the exceptional rates seen in 2017 (+7%) and 2018 (+6%). All regions enjoyed an increase in arrivals in 2019.The Middle East recorded the highest growth in arrivals, followed by Africa and Europe accounts for half of the world's international arrivals, followed by Asia and the Pacific, with 1 in 4 arrivals. The Share of international-domestic passenger traffic by region (2019) as given by ICAO is given below.



Source: ICAO estimates based on ICAO ADS-B, OAG, ICAO LTF, ICAO Statistical Reporting and IATA Economics

The figure gives a comparative idea of arrivals of tourists in these countries specifically. Coming to a detailed analysis of international and domestic passenger traffic, Europe and Asia/Pacific accounted for over 70% of the world international traffic pre-COVID-19 whereas North America and China account for over half of world's domestic passenger traffic.



Source: ICAO estimates based on ICAO ADS-B, OAG, ICAO LTF, ICAO Statistical Reporting and IATA Economics

As the outbreak of corona virus hit the world , the whole of the airline industry faced challenges in terms of reduced passenger traffic both domestically and internationally: There was an overall reduction of air passengers (both international and domestic) ranging from 60% in 2020 compared to 2019 (by ICAO), An estimated loss of approximately 64.2% of passenger traffic and 65% or over USD 111.8 billion airport revenues in 2020 compared to business as usual (by data released by ACI), A 65.9% decline of revenue passenger kilometers (RPKs, both international and domestic) in 2020 compared to 2019 (by IATA),A decline in international tourism receipts of between USD 910 to 1,170 billion in 2020, compared to the USD 1.5 trillion generated in 2019, with 100% of worldwide destinations having travel restrictions (by UNWTO) , leading to almost a projected -3.5% to -4.3% contraction in world GDP in 2020, far worse than during the 2008–09 financial crisis (by IMF and World Bank).

The COVID-19 pandemic has profoundly impacted the operations of air carriers, airports and air navigation service providers (ANSPs). Operational impact and economical impact in terms of number of flights, seats offered, for passenger and cargo flights segmented into international and domestic operations and impact on the revenues of air carriers, airports and ANSPs. can be analyzed using the recent data provided by ICAO using ADS-B Flight aware data and the ICAO Enterprise Data Management (EDM), working

jointly with the Directorate General of Civil Aviation (DGCA) of Turkey to develop interactive dashboards to monitor the impact of COVID-19 on civil aviation. Operational impact on civil aviation is addressed below. Travel and flight restrictions resulted in a decrease in the number of flights and seats offered by the airline industry all over the world. This comparison can be better assessed with the help of the given table prepared using data provided by ICAO comparing the difference between no. of flights operated in 2019 and 2020 in different parts of the world.

REGION OF ORIGIN	2019	2020	DIFFERENCE	% DIFFERENCE
ASIA/PACIFIC	12871466	7958163	-4913303	-38.17205437
EUROPE	9059307	4293028	-4766279	-52.61196027
NORTH AMERICA	18879052	15667774	-3211278	-17.0097418
LATIN AMERICA/CARRIBEAN	3035749	1566460	-1469289	-48.39955477
MIDDLE EAST	1172253	499955	-672298	-57.35093022
AFRICA	952740	442475	-510265	-53.55763377
GRAND TOTAL	45970567	30427855	-15542712	-33.81013769

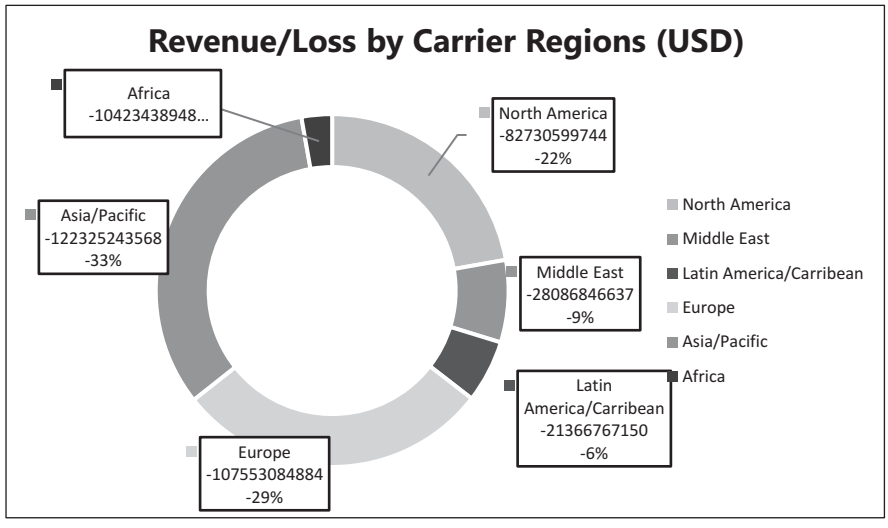
https://data.icao.int/coVID-19/operational.htm

Same analysis applies for assessing the change in no. of seats offered for passenger and cargo flights during the same time period.

REGION OF ORIGIN	2019	2020	DIFFERENCE	% DIFFERENCE
ASIA/PACIFIC	2113685198	1211785747	-901899451	-42.66952581
EUROPE	1455040163	643309920	-811730243	-55.78748021
NORTH AMERICA	1534841294	994476152	-540365142	-35.20658091
LATIN AMERICA/CARRIBEAN	420990220	209015389	-211974831	-50.35148584
MIDDLE EAST	245788307	103888889	-141899418	-57.7323713
AFRICA	156090173	68478761	-87611412	-56.12871734
GRAND TOTAL	5926435355	3230954858	-2695480497	-45.48232345

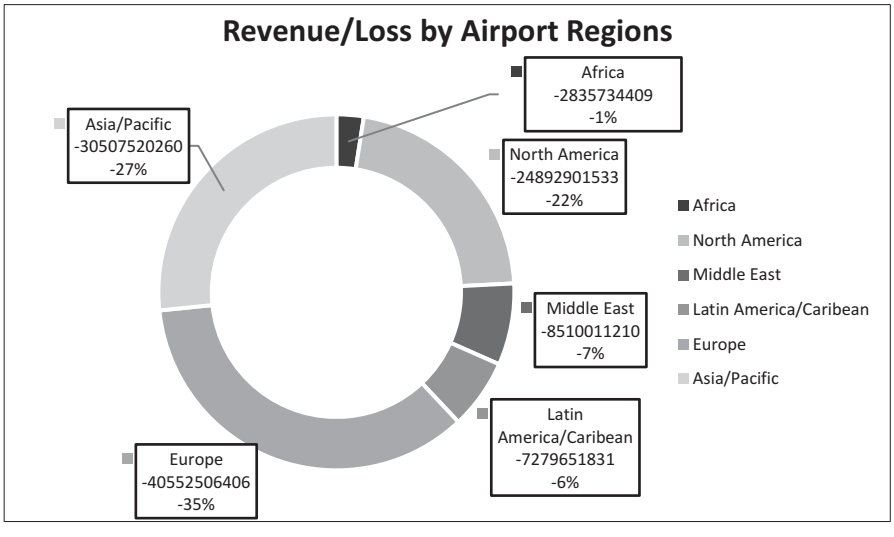
https://data.icao.int/coVID-19/operational.htm

Coming to the economic impact done by covid 19 on airline industry, following table summarizes the situation by comparing the revenues/losses by region of air carrier registrations and route groups with figures of 2019 and 2020



Source: https://data.icao.int/coVID-19/economic.htm

Revenue and losses suffered by airport regions are given below



Source: https://data.icao.int/coVID-19/economic.htm

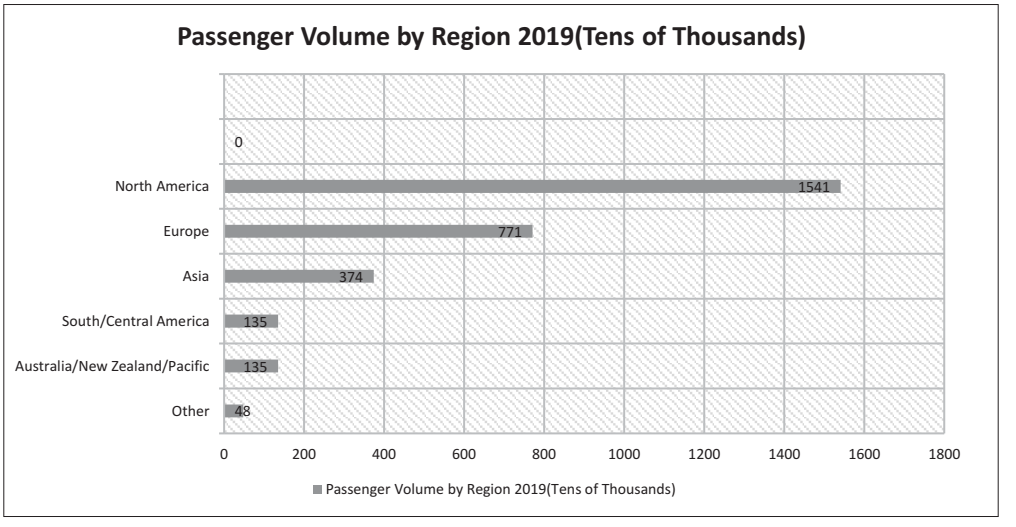
According to **IATA,** corona virus impacted employment as aviation-supported jobs potentially fell by 46 million to 41.7 million (-52.5%).

Direct aviation jobs (at airlines, airports, manufacturers and air traffic management) fell by 4.8 million (a 43% reduction compared with pre-COVID situation).

IMPACT OF CORONA VIRUS ON CRUISE LINE INDUSTRY

Cruise tourism business is a form of traveling for leisure purposes that involves an all-inclusive holiday on a cruise ship including a wide range of activities for travelers in addition to its traditional function of providing transport and accommodation. Being one of the important sub sectors of the travel industry, the cruise line industry is probably the hardest hit by covid pandemic. Despite surviving some of the major outbreaks of Legionnaires' disease, norovirus, SARS and MERS, but COVID-19 threaten to sink it altogether. Being one of the fastest-growing segments in the leisure travel market with high-capacity utilization rates and with demand estimated to grow at 7.0% per annum over the past decade, and cruise passengers surpassing the threshold of 30 million in 2019, According to industry data, the cruise sector supports 1.2 million jobs and contributes US$150 billion to the global economy every year.

Taking into consideration the pre pandemic performance of the cruise line industry and its contribution to the world, the cruise line industry plays an evident role in the creation of jobs and economic opportunities for millions of people around the world. According to the latest report by CLIA, it contributes $154.5 billion total output worldwide, responsible for nearly $50.53 billion wages and salaries and the travel of 29.7 million passengers annually. Coming to the passenger spending part, $ 385 million is the average passenger spending in port before boarding a cruise and $100 is the average passenger spending in port while visiting during a cruise. Cruise business is seen to develop around Caribbean, Australasia, Brazil, Europe, North America, Asia, Canada, UK, and Ireland as can be seen in the graph given below stating passengers as per different regions.



As the World Health Organization (WHO) declared the COVID-19 outbreak as a global pandemic, most countries around the world introduced restrictions to international travel and imposed bans on non-essential travel to contain the virus spread, which also resulted in reputational damage to the cruise industry and falling share values. Cruise lines have also paid a substantial amount of money in refunds for cancellations, incurred costs associated with docking ships at ports where ships are quarantined. These adverse circumstances are vividly reflected on the abrupt share price and market value decline of leading listed cruise companies. The detrimental COVID-19 financial implications for cruise revenue, profits and the gloomy business prospects (risk of closure for several cruise companies) are underlined indeed by the highly volatile and dramatic collapse of share prices for the largest listed cruise groups (even by − 130% on average in few days). Indicatively, Carnival, Royal Caribbean and Norwegian cruise share prices declined sharply at $7.97, $24.36, and $8.40, respectively, as the virus burst, recording losses by 70–80% from the beginning of the year. The COVID-19 pandemic and subsequent pause in commercial cruise operations has had devastating impacts on the cruise community. Between mid-March and September 2020, it is estimated that the suspension of cruise operations has resulted in a loss of more than: $77 billion in global economic activity, 518,000 jobs, and $23 billion in wages. Following the global pause in cruise operations in mid-March, cruises resumed sailing in parts of Europe, Asia and the South Pacific beginning in July 2020.

The cruise industry took immediate and aggressive action in response to the emergence of the COVID-19 public health crisis, working under the guidance of international and national health authorities at every step. There was immediate response and CLIA cruise lines defied the odds and overcame unprecedented challenges to repatriate over 100,000 crew members, often via ship due to commercial air travel restrictions and other barriers. With strict protocols in place, and with the approval and support of local and regional authorities, cruise ships are gradually resuming operations around the world. The industry is on a path to resumption in the United States, Canada, Mexico, the Caribbean and elsewhere in 2021. CLIA members embraced rigorous and science-backed measures to help protect passengers, crew and destinations and support a phased resumption of passenger operations during the health emergency. One of the defining characteristics of the cruise industry is its resiliency. Having said that, cruise business has in fact faced hard times and global crises in the past but managed to recover convincingly, demonstrating tough resilience, adaptability, and flexibility. Despite a challenging year in 2020, there is reason for hope and optimism heading into 2021. 74% of cruisers are likely to cruise in the next few years 2 out of 3 cruisers are willing to cruise within a year, 58% of international vacationers who have never cruised are likely to cruise in the next few years. According to a recent KPMG report, a set of direct responsive actions is under play by the cruise industry to keep future business intact; including bonus credit offers (110–125% of booking amount) instead of cash refunds, as an option to cruise passengers, whose trips have been cancelled due to the pandemic, providing flexibility for future bookings. Based on recent UBS bank estimates, around 76% of the passengers whose cruises were cancelled due to pandemic have opted for a credit for future trips instead of a refund. Furthermore, based on a recent CLIA survey, 82% of cruisers indicate their interest in booking a cruise for their next vacation. Despite multiple outbreaks of COVID-19 and uncertainty over when sailing will reconvene, several reports record increased bookings for 2021 in comparison to 2019. Even as CLIA members worked tirelessly to address the impacts of COVID-19, the cruise industry remained focused on its commitment to a cleaner, more sustainable future. 40% Target Rate of reduction in carbon emissions by 2030, compared to 2008. $23.5 billion Invested in ships with new technologies and cleaner fuels to reduce carbon emissions. 24 ships on order book through 2027, committed to be powered by Liquefied Natural Gas (LNG).

CLIA's annual 2020 Environmental Technologies and Practices Report highlight the progress that the cruise industry continues to make in the adoption of new environmental technologies. LIQUIFIED NATURAL GAS (LNG), 49% of new capacity on order will rely on LNG for primary propulsion. EXHAUST GAS CLEANING SYSTEMS (EGCS), More than 69% of global capacity utilizes EGCS and 96% of non-LNG new builds will have EGCS installed. ADVANCED WATER TREATMENT SYSTEMS, 99% of new ships on order will have these systems in place, bringing global capacity served by these systems to 78.5%. SHORE SIDE ELECTRICITY, 58% of new capacity is committed to be SSE compatible, 32% of global fleet capacity already capable of SSE, and 25% of existing capacity will be retrofitted to use SSE.

IMPACT OF CORONA VIRUS ON HOTEL INDUSTRY

Hotel industry plays a vital role in the travel industry as a whole. As the outbreak of corona virus disrupted most of the operations of the hotel industry it led to huge losses to firms, tourism, and the economy as a whole. The tourism industry was affected as the travel opportunities for Chinese tourists, who usually spend billions annually, were severely curtailed. There were increased flight cancellations, cancelled hotel bookings and cancelled local and international events worth over $200billion. Hotels across the world witnessed booking cancellations worth billions of dollars, and the hotel industry sought a $150bn bailout. Multiple hotels in the US, UK and in some European counties announced the temporary suspension of normal operations which puts the estimated loss of jobs to 24.3 million globally, and 3.9 million in the US alone due to the decline in hotel occupancy during the pandemic period. The economic impact of the pandemic on the hotel industry was more severe than the 9/11 and 2008 recessions combined as industry borne the brunt of many large-scale cancellations across the corporate, MICE and leisure segments; some experts predicted a weak Q4 2020 & Q1 2021 for the Indian hotel industry. For Europe, Industry experts have predicted the effect upon the global hotel industry for 2020, estimating a profit decline of 11-29%. Considering China where the outbreak began; the hotel industry suffered 68% lower occupancy initially. Hotels across the U.S. experienced unprecedented booking cancellations due to the pandemic, which could eliminate up to four million posts (this accounts for 50% of all hotel jobs in America). The average occupancy in Italy was down by 96%; the

United Kingdom was down by 67% initially. Hotel industry revenue per available room in the United States fell 11.6% for the week ending March 7, 2020, whilst in China occupancy rates fell 89% by the end of January 2020. Other United States hotel companies are seeking approximately $150bn in direct aid for employees due to an unprecedented fall in demand, along with an estimated $1.5bn loss since mid-February. MGM Resorts International has also announced a temporary suspension in operation at its Las Vegas properties, with casino operations closing on 16th March, followed by hotel operations. Since March 1, 2020, hotel occupancy in Germany decreased by over 36%. Italian cities including Rome have been inadvertently affected with a current occupancy rate of 6%, whilst London remains the most stable with an occupancy rate of approximately 47%. Overall, the COVID-19 crisis has led to international distortions for the hospitality industry, and significant slumps for the European hotel market.

The above data gave a vague idea regarding the effect of covid on the hotel industry for several countries. We can analyze the situation more deeply by taking into account several countries and their performance during the pandemic times. Indian hospitality industry is one of the largest tourism Industry of the world and more than 2000 hotels and 1000 restaurants enlisted under FHRAI (Federation of hotel restaurant association of India) 2020, which provide employment to laths of people. Due to lockdown in India and COVID-19 threat, process of reservation cancellation is being carried out which will adversely affect the hotel business and likely to face revenue loss in 2020 and the parallel negative impact can be seen on employment in the future as a cost cutting tool. Intercontinental hotels group anticipates global RevPAR decline of around 60%.

Talking about US Hotel industry performance, the hotel industry's greatest resource is its workforce, the members of which are the heart of hospitality. The onset of the COVID-19 pandemic brought hotel occupancy to a historic low of 24.5% in April 2020. Annual occupancy in the United States fell to roughly 44% for the full year. Additionally, the total number of rooms occupied fell by 458 million from 2019 figures. Yet in 2020, more than 670,000 direct hotel industry operations jobs and nearly 4 million jobs in the broader hospitality industry were lost due to the pandemic. Overall, the accommodations sector faced an 18.9% unemployment rate as of December

2020, according to the Bureau of Labor Statistics. This figure understates a portion of the problem as there are many workers previously employed in hotels that are exiting the industry and/or the workforce entirely. Oxford Economics projects that the direct hotel industry jobs unemployment figure will exceed 20% in 2021. In 2022, the number of jobs is projected to slightly increase compared to 2021, but the total direct hotel jobs will remain 184,092 fewer jobs when compared to 2019. Moreover, the industry is not expected to reach 2019 employment levels until at least 2023.This has eliminated more than 10 years of job growth in the accommodations sector, according to BLS.

IMPACT OF CORONA VIRUS ON CAR RENTAL INDUSTRY

Car rental or car hire agencies are agencies that rent automobiles for a short period of time at certain cost. This service is often organized with many local branches, which are generally located near airports or busy areas in the city and are complemented by a website to allow online reservations. The global car rental market is segmented on the basis of application, rental category, vehicle type, and region. By application, it is classified into leisure and commercial. By rental category, it is divided into on-airport and off airport. On the basis of vehicle type, it is categorized into luxury car, executive car, economical car, Sports Utility Vehicle (SUV), and Multi Utility Vehicle (MUV). Region wise, the market is analyzed across North America, Europe, Asia-Pacific, and LAMEA. Sudden outbreak of corona virus has resulted in cessation of certain industries and sectors being unable to cope up with the sudden lockdown, while those adapting to the new scenario are still in the picture. But while such is the case, a different story goes for the rental car industry.

The arrival of the pandemic changed the scenario completely and only those industries managed to survive who changed themselves according to the new normal. While covid proved to be a breaker for several sectors it laid down certain opportunities for the car rental industry. However, the global car rental business reached a decline of 32% in 2020. HERTZ Corporation also filed for bankruptcy after its business was decimated during the corona virus pandemic and talks with creditors failed to result in much needed relief. But at the same time the global car rental market size is expected to reach over USD 187.5 billion by 2026 and is expected to grow at a CAGR of 13.7% during the

forecast period, 2019–2026 Geographically, the car rental market has been segmented into North America, Europe, Asia Pacific, and Latin America and the Middle East & Africa (LAMEA).

North America dominates the global Car Rental market owing to the growing adoption of rental vehicles and increased investment in the countries such as the U.S. and Mexico are driving the market growth in North America. The practice of carpooling or sharing mobility is long gone. The pandemic-induced lockdown has directed the most significant emphasis on self-quarantine and social distancing. There is growing paranoia about the hygiene and safety of one's immediate surroundings. This is where rental cars come into the scene. People are turning to rental cars that they could utilize for mobility without the pre-pandemic practice of sharing with co-riders. It is not as if the rental service was non-existent in pre-COVID times. It was thriving even before the onset of the pandemic. The global crisis has merely accelerated the adoption of rental cars in ways that were never witnessed before. At the macroeconomic level, it actually plays really well for car rentals, because you are able to deliver something well which is sanitized, clean, personalized, and private as well as something which is affordable. The subscription model has become the face of the car rental industry in recent times. Since this model allows the customer to enjoy temporary ownership of the vehicle without worrying about additional costs such as maintenance and insurance premiums, it has become a hit, particularly amongst the younger generation. Service providers are leaving no stone unturned to ensure that maximum safety and hygiene is maintained. Along with this, they are also leveraging cutting-edge technologies such as AI and ML to bring in features such as keyless entry systems, 24x7 chat bots, etc., to offer customers an immaculate experience. Besides, even staff on the front lines is subjected to mandatory training in safety protocols.

CONCLUSION

The impact of corona virus on the overall travel industry is assessed considering major subsectors of the industry. Tourism being directly related to travel industry affected major subsectors harshly. Even though there was increase international tourists' arrivals in 2019, led by the Middle East (+8%). Asia and the Pacific and Europe both saw 4% growth. Between 2009 and 2019,

real growth in international tourism receipts (54%) exceeded growth in world GDP (44%). According to UNWTO estimates pandemic lead to decrease in International tourist arrivals (overnight visitors) by 74% in 2020 over the previous year. Airport regions and carrier regions suffered losses of around 114,578,325,648 USD and 372,485,980,931 USD globally respectively Governments have to strike the balance between support to the aviation industry and the need to preserve competition, in particular when considering firm-specific measures. Coming to cruise line industry, estimates confirm cruise industry as the worst hit by pandemic. But there are chances of fast recovery of cruise line industry in 2021. Hotel industry too confronted cancellations, room vacancy and high costs despite this, the industry is resilient, and hotels across the country are focused on creating an environment ready for guests when travel begins to return in 2021. Leisure travel is expected to return first, with consumers optimistic about national distribution of a vaccine and their ability to travel again this year. At the same time, business travel—which comprises the largest source of hotel revenue—remains nearly nonexistent, though it is expected to begin its slow return in the second half of the year according to AHLA.

Car rental industry is expected to benefit from the outbreak of pandemic after the slowdown of its operations in the initial phase as people have sorted out their priorities and demand for the same has increased in the following period. With constant changes and adaptive policy being followed by the industry car rental may grow at a much faster rate in the coming period of time. According to reports countries with inherent domestic destinations, which tourists can visit with the help of personal transportation could witness a quicker recovery. Taking into consideration India and the trends witnessing revival of tourism industry, as India offers geographical diversity, attractive beaches, 37 world heritage sites and 10 bio geographic zones, it is estimated that the tourism sector will grow 6.7% to reach 35 trillion (USD 488 billion) by 2029. With the travel and tourism sector being harshly hit by the outbreak of virus, India's tourism sector has the ability to revive early as compared to other sectors. With the revival of domestic travel, emergence of recovery indicators has come to the rescue of the hotel sector. The recovery has been primarily driven by leisure 'revenge travel' during weekends, festival season, weddings and demand of food and beverage. Furthermore, domestic leisure travel will continue to drive occupancies across the country. Goa continues to

be the RevPAR leader in absolute terms despite a decline of 33.3 per cent in Q4 2020 compared to Q4 2019. Demand for domestic leisure travel amidst international travel restrictions has made Goa the fastest recovering market in absolute terms. Domestic passenger traffic at Goa airport is getting back to normal as the facility has recorded about 75% footfall so far this year compared to the same period last year during pre-COVID-19 times. Government support measures in the direction towards the upliftment of travel and tourism sector also ensure the quick revival of India's travel and tourism sector.

REFERENCES

A LIFELINE FOR SMALL ISLAND STATES: UNWTO JOINS IMO TO HIGHLIGHT IMPORTANCE OF CRUISE TOURISM. (2020, November 5). Retrieved from www.unwto.org: https://www.unwto.org/news/unwto-and-imo-issue-join-to-support-safe-resumption-of-cruise-ship-operations

Air passenger traffic in Goa returning to normal. (2020, november 30). Retrieved from www.thehindu.com: https://www.thehindu.com/news/national/other-states/air-passenger-traffic-in-goa-returning-to-normal/article33208468.ece

Car Rental Market (By Booking Type: Online Access, Offline Access; By Application Type: Leisure/Tourism and Business; By Vehicle Type: Economy/Budget Cars, Luxury/Premium Car) - Global Industry Size, Share, Trends and Forecast 2019 - 2026. (n.d.). Retrieved from car rental market value to reach USD 187.5 Billion by 2026: https://www.acumenresearchandconsulting.com/car-rental-market

COVID-19 and Aviation industry-impact and policy responses . (2020, october 15). Retrieved from www.oecd.org: https://www.oecd.org/coronavirus/policy-responses/covid-19-and-the-aviation-industry-impact-and-policy-responses-26d521c1/

COVID-19 impacts on global cruise industry-KPMG GLOBAL . (2020, july 23). Retrieved from www.home.kpmg: https://home.kpmg/xx/en/blogs/home/posts/2020/07/covid-19-impacts-on-global-cruise-industry.html#:~:text=Based%20on%20a%20recent%

20survey,2021%20in%20comparison%20to%202019

COVID-19:Impact on Hospitality Workforce . (n.d.). Retrieved from www.hospitalityinsights.ehl.edu: https://hospitalityinsights.ehl.edu/covid-19-impact-hospitality-workforce

Domestic travel to continue aiding hotel recovery in 2021: JLL. (2021, february 15). Retrieved from www.financialexpress.com: https://www.financialexpress.com/lifestyle/travel-tourism/domestic-travel-to-continue-aiding-hotel-recovery-in-2021-jll/2195209/

Economic Development of Air Transport /COVID-19 Air Traffic Dashboard. (n.d.). Retrieved from www.icao.int: https://www.icao.int/sustainability/Pages/COVID-19-Air-Traffic-Dashboard.aspx

Effects of COVID-19 on Global Car and Chauffeur Rental. (2020, december 1). Retrieved from www.tcgconsulting.net: https://tcgconsulting.net/effects-of-covid-19-on-global-car-rental/

(2020). Effects of Novel Coronavirus(COVID-19) on Civil Aviation:Economic Impact Analysi. ECD@icao.int. Retrieved from www.iaco.int.

Gok, F. A. (2020). The effect of COVID-19 pandemic on domestic tourism: A DEMATEL method analysis on quarantine decisions. *Elsevier Public Health Emergency Collection*.

Hertz files for U.S. bankruptcy protection as car rentals evaporate in pandemic. (2020, may 23). Retrieved from auto.economictimes.indiatimes.com: https://auto.economictimes.indiatimes.com/news/aftermarket/hertz-files-for-u-s-bankruptcy-protection-as-car-rentals-evaporate-in-pandemic/75910857

Indian Tourism and Hospitality Industry Analysis Presentation | IBEF. (2021). Retrieved from www.ibef.org: https://www.ibef.org/industry/indian-tourism-and-hospitality-industry-analysis-presentation

Kumar, D. A. (2020). Disastrous impact of Coronavirus (COVID 19) on Tourism and Hospitality . *Journal of Xi'an University of Architecture & Technology*, 698-712.

MariaNicolaaZaidAlsafibCatrinSohrabicAhmedKerwandAhmedAl-JabirdChristosIosifidiscMalihaAghaeRiazAghaf. (2020, june). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*, pp. 185-193.

Nicolau, A. S. (2020). An open market valuation of the effects of COVID-19 on the travel and tourism industry. *Elsevier Public Health Emergency Collection*.

operational impact on air transport . (n.d.). Retrieved from www.icao.int: https://data.icao.int/covid-19/operational.htm

(2021). *REPORT: HOTEL AND TRAVEL OUTLOOK IN 2021*. AMERICAN HOTEL & LODGING ASSOCIATION.

RiberioSorianobMałgorzataPorada-Rochońc, M. (2021). Impact of COVID-19 on the travel and tourism industry. *Technological Forecasting and Social Change*.

SahinGok, F. (2021). The effect of COVID-19 pandemic on domestic tourism: A DEMATEL method analysis on quarantine decisions. *International Journal of Hospitality Management*.

State Of The Cruise Industry Outlook 2021|CLIA. (2021). Retrieved from www.cruising.org: https://cruising.org/en/news-and-research/research/2020/december/state-of-the-cruise-industry-outlook-2021

The impact of COVID-19 on aviation. (n.d.). Retrieved from www.iata.org: https://airlines.iata.org/news/the-impact-of-covid-19-on-aviationhttps://airlines.iata.org/news/the-impact-of-covid-19-on-aviation

The Rental Car Industry In 2020: How The Pandemic Has Impacted The Sector. (2020, october 10). Retrieved from www.bwautoworld.businessworld.in/: http://bwautoworld.businessworld.in/article/The-Rental-Car-Industry-In-2020-How-The-Pandemic-Has-Impacted-The-Sector/10-10-2020-330033/

TheodoreSyriopoulosMichaelTsatsaronisMarthaGorila. (2020, september 26). The global cruise industry: Financial performance evaluation. *Research in*

Transportation Business & Management.

Vineet Kumar, P. U. (2020). Indian Tourism Industry and COVID-19: Present Scenario. *Journal of Tourism and Hospitality Education*.

WORLD TOURISM ORGANISATION. (2020). International Tourism Highlights, 2020 Edition. *International Tourism Highlights, 2020 Edition*, 23.

WORLD TOURISM ORGANIZATION. (n.d.). Retrieved from www.unwto.org: https://www.unwto.org/taxonomy/term/347

Education Crisis in India and its Impacts

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Abstract

This paper primarily focuses on the need of students to take education loans in India and the burden created on them due to several factors, one of them being the weak education system. Through our analysis, we found that the government intervention in the Education system through its expenditure policies is way below the standard. This makes the Indian Education System weak, leading to students opting to go abroad or join Private Universities in India and thus raising the demand for an education loan. We conducted a sample survey which helped us in reaching various conclusions. One of them being the high per subject expenditure for secondary school level education which ultimately leads to an overall high population expenditure on education for pursuing higher education as well i.e. for under-graduation or post-graduation, education loan becomes a necessity. In this paper, we have tried to consider all such parameters which direct the student to opt for an education loan and its various implications. Besides, we have also analysed the terms and conditions of sanctioning education loans in India and the consequences when such loan is not repaid.

INTRODUCTION

"The highest education is that which does not merely give us information but makes our lives in harmony with all existence." *-Rabindranath Tagore*

India has one of the highest populations in the world with nearly 1.3 billion minds. This can be the best tool for India to harness its unutilised potential to develop. Education is the means to make use of the brilliant human minds in building a better society and environment. But with this huge population, cut throat competition becomes a part of every race.

With time, Indian citizens have seen a drastic increase in the expenditure to educate themselves. Students are struggling for every seat available in any educational institution, every scholarship offered, etc.

Government and government aided institutions did not have sufficient seats to satisfy the growing population needs. The Education Policy of 1992 was a move to incentivise the private players to enter the education field. Private institutes came up and several deemed universities were made. This has increased the number of seats available for students. This move might seem to be good from the point of view of the government, but it comes at the cost of increased education expenditure.

Meritorious but poor students try their hands to get government scholarships, grants or subsidies to cover the increasing cost of education.

Rich people have sufficient resources to pay off their expenses but the middle class and lower-class people are unable to do so. They need external assistance and this is where the lending institutions, especially the banks, play an important role. They have the obligation to provide loans to such students so that the country flourishes. Also, the central bank and the Indian Bankers' Association introduced a model education scheme that seeks to provide loans at affordable rates.

So, throughout this paper we have tried to analyse how exactly the expenditure on education has drastically been increasing despite a fall in the quality of education, further instigating people to take

loans to pursue studies at better institutes or sometimes abroad. Its implications and the role of the banking sector in the whole scenario have also been studied in depth.

LITERATURE

According to the then human resource development minister Mr. Kapil Sibal, only 12 out of every 100 children in India reach graduation level whereas it is 50-70 in Europe and the global average is 27. The government wished to increase the figures to 15 by 2012 and 30 by 2020.

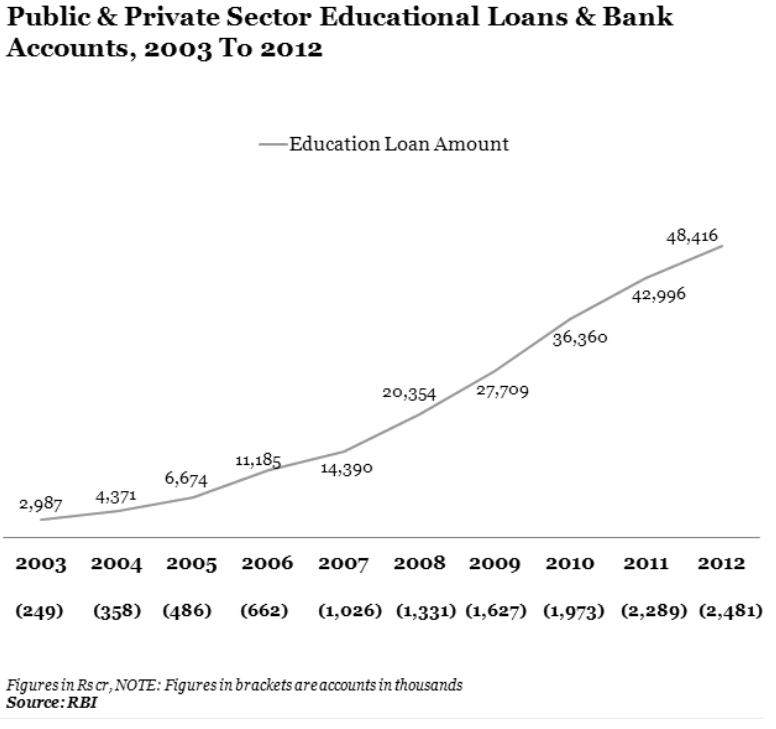
Moreover, Globalization makes a clear statement that only those countries that have a knowledgeable and adaptive human capital can survive amidst the cut throat competition.

To bring about the changes, India had to push its investment in the country. So, "The Right of Children to Free and Compulsory Education Bill, 2009" was passed by the Indian Parliament on August 4, 2009. The bill aimed to increase both the literacy rate and the number of students passing out as graduates.

To move ahead with this aim, several public and private sector banks were asked to mandatorily issue educational loans. Earlier these loans were granted on similar terms to those of personal loans but later the model was changed by the Indian Banking Association. Terms were changed and majority of the loans were granted to students taking up careers and courses oriented towards more demanding jobs in the market. This action was further fuelled when students started committing suicide as they were unable to finance their education and couldn't fulfil their dreams.

Since then, the number of loans has been following an upward trend. The amount of education loans granted by commercial banks both public and private has been increasing from 2003 to 2012. When self-financing institutions were allowed to operate, the number of educational loans drastically increased.

Chart 1: Graph showing total amount of educational loans granted from 2003-2012



As per the data extracted from NSSO, the number of educational loans was 2.3 million in 2011–2012, which increased from 0.11 million in 2000–2001. The proportion of students sanctioned loans and enrolled in higher education constituted about 1.3% of total number students enrolled in 2000–2001 and increased to around 9% by the beginning of 2011–2012. Not only has the number of students sanctioned with education loans increased, but also the monetary amount of education loans given has also increased rapidly.

Although the amount of loans being granted have increased for the last decade, recently it has witnessed a drop. The outstanding loans, as on September, 2017, stood at Rs 71,975 crore and fell to Rs 66,902 crore in November, 2019. On a year-on-year basis, the education loan portfolio of banks has shrunk by 3.5% in the twelve months to November, 2019.

The amount of growth in educational loans was more than the expenditure incurred by the government on higher education indicating the fact how the government gradually withdrew from funding higher education of the Indian citizens.

This is because, although the government has been spending higher amounts each year, it is comparatively lower in proportion to the increasing GDP. According to several economists, the gross enrollment ratio should be at least 20% in higher education, which is much lower in India.

The extent of public and private share of enrollment and institutions in higher education determines the demand for education loans. Hence, demand for education loans is determined by several factors such as family income, social composition of the population and public versus private share of enrollment in higher education, cost of higher education, subsidy in education loans and benefits derived by spending such loan.

Human Capital Theory suggests that an individual will invest in human capital only if the future benefits derived exceed the cost incurred on education.

To get better job prospects and a potential to earn higher income, investment in higher education is desirable and mandatory. The same can be associated with the reputation and better knowledge imparting abilities of colleges and universities. The better value a university holds, more are the chances that big brands and MNCs hire its students, offering them handsome packages.

But this is not the only way to get good jobs as data suggests that in these premier institutions 30-35% students get jobs and only 10-15% get jobs with a higher earning capacity. However, in today's economic turbulence with occasional work-force reduction all over the world, fuelled with the pandemic, even big companies are recruiting a smaller number of candidates.

Even after studying at a reputed educational institution when a student isn't able to get a job, he has no means left to pay off his debt. Such students are said to be credit-constrained if they are unable or unwilling to invest their parental income in their education. Credit-constrained students are being defined as those who did not receive financial support from their parents for education. For these kinds of students borrowing through student loans to

finance college education is a utility maximization solution for credit-constrained students.

These students may not enjoy the benefits of student loans even if credit is available. It is observed that they are hesitant to finance their education through student loans because of debt aversion, self-control, complexity of the loan terms and institutional barriers. A student loan borrower has to consider the future repayment which depends on his own future earnings. Hence, a risk-averse student may decide not to borrow for college even though the expected return may be greater than the cost.

Several researchers have also found that debt caused more graduates to choose higher-salary jobs rather than lower-pay "public interest" jobs. To increase the culture of entrepreneurship in India, youth should be free from financial constraints then only they will think of going for risky ventures where income is uncertain.

Private loans granted by banks and other financial institutions are made based on repayment ability and security attached with the borrower and hence are geared towards students with better financial stability. There are many challenges in the private student loan market. These include uncertainty about college completion (as many students aren't able to cope up with college studies and then banks withhold their future loan instalments), their unpredictable future income and information asymmetry. In the absence of an efficient student loan market, credit-constrained students might compromise their consumption and leisure to achieve a college degree.

Due to the emergence of a large number of sub-standard educational institutions running with poor infrastructure and under-qualified faculty, have also made employers wary of hiring, contributing to the increase in student loan defaults.

The slowdown in the economy resulting in lack of job opportunities is identified as the prime cause for educational loan defaulters. Another major concern many banks face today is wilful defaulters, those who don't care to repay banks simply because they have forgotten to repay these educational loans despite having a job and steady income.

Along with other factors of default, one of the major reasons has been the bad career choice made by the students. Many a time students end up taking such courses which have high earning potential but without having the right aptitude and interest for a particular field. This makes them unskilled graduates and that in turn reduces their chances of getting a good job, thus making them obvious defaulters of educational loans.

Let's have a look at how the Banks issue student loans and the measures they have adopted to reduce defaults.

In the year 2001, Indian Banking Association adopted a framework for issuing educational loans through public sector banks as recommended by the Central Government. As public sector banks have adopted this, private, cooperatives and other scheduled banks also accepted it. Private loans have also been issued at different rates based on the educational loan terms such as provision of co-signer, collateral, etc.

Before a loan is granted there are several factors that are taken into account, one of them being Financial Need which is equal to the total cost of the course* reduced by the parental contribution for the same.

*The cost of the course for enrolment/admission is determined by information on tuition fee, exam fee, cost of study material, stationery, lab fee, computers, lodging and boarding, travel, insurance and others.

So, the net of financial need will be estimated by the excess of total financial need over scholarships and other concessions.

Educational loans come under the priority sector. Hence 40% of total loans must be under that category. Certain banks like UCO bank maintains different loan products such as ASPIRE Loan for loan amount more than 75 lakhs which is for students going abroad and requires both collateral and co-signer, PREMIUM loan for loan amount more than 30 lakhs for education in IITs & IIMs with no collateral and only co-signer.

Subsidies are also granted to students during payment of loan whose family income is low but is not a defaulter under certain schemes like CSIS, Ambedkar Student subsidy, Padho Pardesh etc.

All these schemes allow the benefit of interest subsidy only once in the whole educational tenure of the student whether at the time of under-graduation, post-graduation or Ph.D.

However, the criteria for granting loans are different for different sections of the society (based on geography) and gender. Female students are given grants or loans at concessional rates. Certain relief measures are provided to the disabled. Another important criterion being often looked at is the type of institution where the student is going to study. That in turn determines their prospective earning capacity. Central and private institutions are considered of better value than state and private aided ones. Background check of the family is equally important to understand the repayment ability of the borrower (CIBIL score of borrower, parents and spouse). People with CIBIL score below 600 are denied.

As the banks charge simple interest on the loan till the education is completed by the student and start compounding it when the student graduates or gets a job, it was felt that a major part of loan burden was not the principal amount but the interest accumulated on the same which may be the reason for increasing NPAs.

Consequently, increase in NPAs has caused a sudden decline in the amount of loans granted in 2017, 2018 and 2019 of 3.3%, 4.7% and 5.6% respectively. Today 91% of the student loans are granted by government banks hence they bear the maximum burden of such defaults. Although the percentage is less than the private sector is preferring to lend for other lucrative purposes. With bad loans on the rise from this sector, banks have come with novel ways of tracking wilful defaulters. Banks have now started following their borrowers on social media. This also makes it easier for banks to trace the student's whereabouts that would facilitate banks to recover loans in a cost-efficient manner.

Additionally, banks have also started issuing joint loans to students along with their parents as many defaulters being females were married and banks couldn't reach them. Also, just because their parents had no liability against the loan, the banks were unable to recover their loan amount. Sometimes wilfully, the parent has to take the additional burden of repaying the student

loan if their daughter is married soon after graduation in order not to embarrass the groom.

Loans are granted to those individuals whose family's salary accounts are maintained in the same bank. Banks make the use of Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 (SARFAESI ACT) to auction residential and commercial properties held by banks as collateral to recover the loan.

Despite all these measures, there was a delinquent behaviour observed in loans overdue for more than 90 days, with 13.34% increase in March, 2020 than 12.76% in December, 2019. The non-performing assets have been on the rise in the education sector and have registered an increase of 142% from 2013 to 2016 estimating to Rs. 3,127 crores. The share of NPAs saw an increase to 8.76% from the earlier 5.4%.

Increasing NPAs force banks to ask for more collateral hence following the vicious cycle again. Human capital cannot serve as a collateral because of its intangible nature hence something tangible must be there in the form of a security. Therefore, this requires intervention of the government to break the cycle. Giving out loans seems to endure an imbalance and insensitivity towards the poor.

Today central and several state governments are found to have a different motive to issuing loans which is to win the favour of people in elections. This was noticed when the state government of Kerala announced in its previous budget to write off interest on educational loans granted between 2003 and 2009. Although these policies are widely believed to have a political motive, they cannot be disregarded as much needed economic interventions.

The most important question as to whether educational loans should be waived off or not, or should a moratorium period be provided or any interest subsidies is the subject matter of the paper.

We have dissected the paper into 6 parts. The first being the **overview** which helps the readers understand the method through which the paper has been approached, second being the **literature** which draws the picture of the

financial industry and how the educational loan environment has been progressing, its current state and developments, then the third part is **research methodology** where we have tried to understand the impact in greater depth through both primary and secondary data, fourth part being the **results and implications** where we have explored the sample data, fifth part being the **analysis** where we have stated the final say on the idea of waiving of educational loans in the Indian market and the various policies that can be taken up in the future and last but not the least is the **conclusion** where we end the paper by stating our results and the things we expect to be undertaken in India for it to become a superpower house in the educational front.

RESEARCH METHODOLOGY

We conducted a small survey comprising 169 people, majorly undergraduate students, to analyse how efficient is the education system in India, what were the major responses among the survey group and what were their takeaways on the systems. Several questions were asked in the questionnaire ranging from their annual expenditure on education including coaching classes and tuitions, reasons for taking additional classes, loans taken to study abroad, methods of repayment of loan etc. Further t-tests and z-test were applied on the data so collected to understand how the population inclined from the sample data.

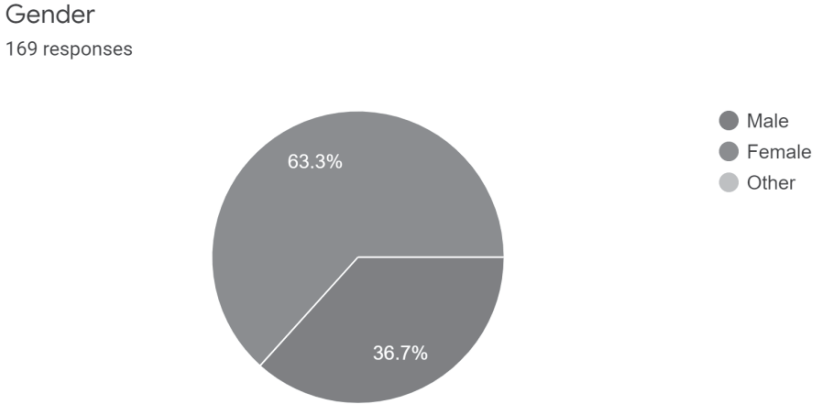
DEMOGRAPHY OF DATA

The target group in the survey is the middle income and the upper middle-income group. Out of the group of 169 people, 63.3% were females and 36.7% were males. A lot of females were asked to fill the survey to get an aspect of their thinking and preference in the current world rather than focussing on male since major research papers have a male dominated group.

Due to data constraints, the major group of people being surveyed are from the Commerce background. The preferences are hence inclined towards the domain of business, analytics, management, finance, M.Com etc.

The survey is done via google forms that were distributed through social media platforms. The demography is mainly Indian in nature.

Chart 2: Proportion of male and female out of total respondents

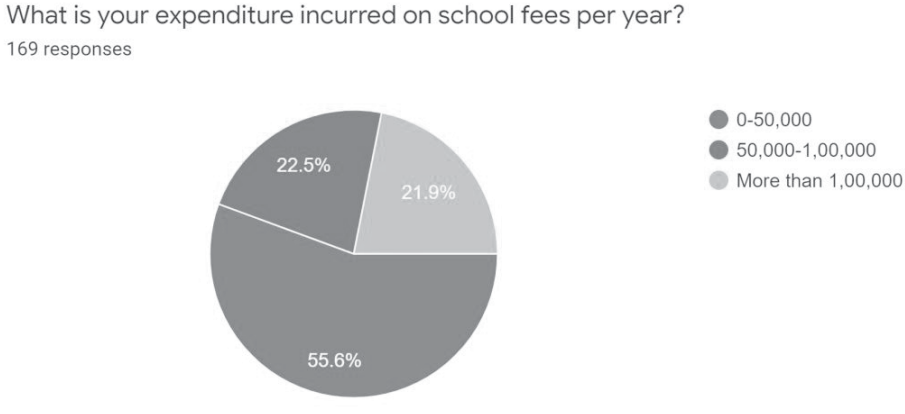


Source: Sample survey of 169 students conducted by the authors of this research paper

The visualisation of the data represents the responses collected through the survey forms.

VISUALISATION OF DATA

Chart 3: Per year expenditure on school fees incurred by the respondents



Source: Sample survey of 169 students conducted by the authors of this research paper

We can see that usually the expenditure incurred by the people from the sample group falls under the category of 0- 50,000 Indian rupees and with nearly an equal number of people who spend more than 50,000 but less than 1,00,000 and people who spend more than 1,00,000 yearly.

Table 1: Inflation figure for the respective years

Year	Percent
2010	11.99%
2011	8.86%
2012	9.31%
2013	10.91%
2014	6.35%
2015	10.91%
2016	4.94%
2017	2.49%
2018	4.86%
2019	7.66%

Source: World bank.org

Table 2: Sample statistic of the data surveyed

sample mean	73955.38
sample standard deviation	54841.72
n	169
95% confidence	
confidence interval width	8268.292

Source: Sample survey of 169 students conducted by the authors of this research paper

We can say that the population expenditure for the middle section of the society lies at about rs 65,687.09 to rs 82,223.67 per year.

Table 3: Preference of surveyed candidates to attend government schools or foreign institutes (including the need to take educational loans)

Would you prefer attending government schools/colleges?	Are you planning to study abroad? Or have you got admission abroad?	Have you taken any loan or are you planning to take one for pursuing education abroad?	No of responses in each category
Yes	Yes	No	13
Yes	Yes	Yes	12
No	No	Yes	1
No	Yes	No	6
Yes	No	No	2
No	Yes	Yes	5

Source: Sample survey of 169 students conducted by the authors of this research paper

Accordingly, we finally shortlisted the most important categories highlighted in pink. The "No yes no" and " No yes yes" categories help in understanding how many people wish to continue their education abroad. Among the major reasons for opting to study outside India was because the education system was poor, obsolete and not practical in nature to what hirers actually required. This tells us the deteriorating condition of the most important system prevalent in India. This is one of the reasons why India experiences a higher rate of brain drain and why Indian youth studying in India face so much difficulty in being placed in a good commercial organisation.

We conducted t-tests to find out the population proportion of the number of people who do not prefer to study in government institutions but those who wish to go out (on their own wealth or by taking loans both included). The results derived were (given 38 as the degrees as freedom)

Table 4: Categorization of choices (from table 3) and the respective t-test result (Scenario 1)

Categories			
No yes yes	5	p- sample proportion	0.282051
no yes no	6	q	0.717949
Total	11		

	Case 1
t value	2.024394164
standard error	0.072057377
mean error	0.145872533
confidence interval (starting from)	0.136178749
confidence interval (ending at)	0.427923815
mean error using excel formula for verification	0.145872533
standard deviation of the sample distribution of sample proprtion	0.449998174

Source: Sample survey of 169 students conducted by the authors of this research paper

From the above data we can understand the population proportion can be expected to be about 13.61% to 42.79% which shows a significant number of students willing to go abroad.

Table 5: Categorization of choices (from table 3) and the respective t-test result (Scenario 2)

People wishing to go abroad(despite saying yes to govt schools)		Case 2	
yes yes yes	12	p- sample proportion	0.641026
yes yes no	13	q	0.358974
total	25		

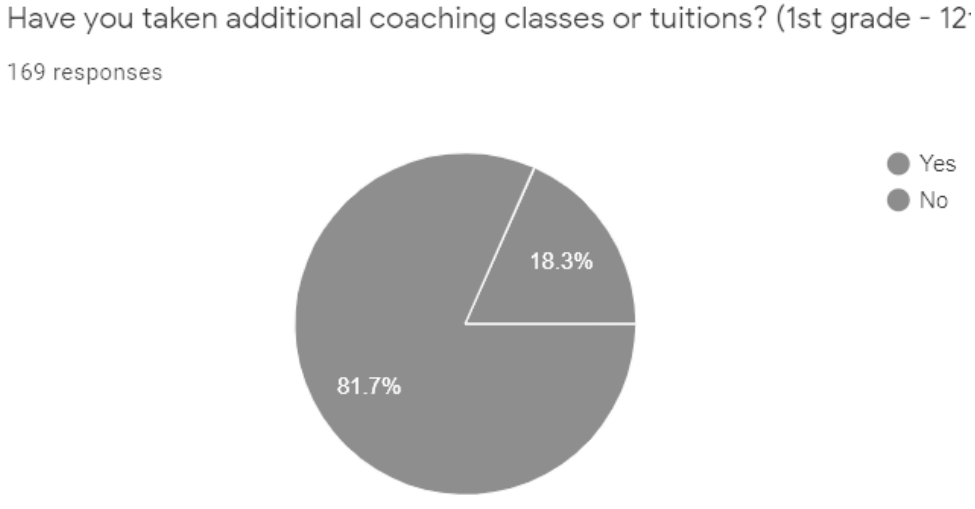
t value	2.024394
standard error	0.076813
mean error	0.155501
confidence interval (starting from)	0.485525
confidence interval (ending at)	0.796526
mean error using excel formula for verification	0.155501
standard deviation of the sample distribution of sample proprtion	0.4797

Source: Sample survey of 169 students conducted by the authors of this research paper

For the next two most important categories clubbed as one (highlighted in red) it considers those students who wish to do their undergraduate in India and then move abroad to pursue higher education (taking loan and without taking loan). One of the causes which we can find among the sample survey responses was the efficiency of Indian education system in certain domains like the government medical institutes, few top engineering institutes like IIT, NIT etc and management colleges and universities (IIMs). The most preferred were these. This part of the survey also tells of the want of students to go outside India.

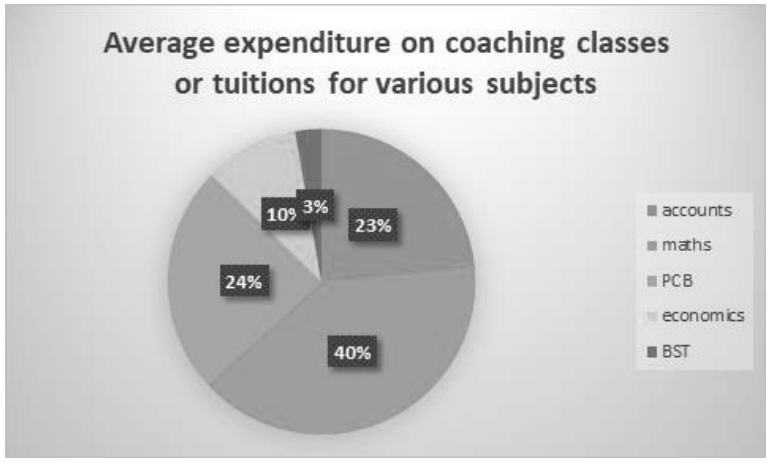
From the above data we can understand the population proportion can be expected to be about 48.55% to 79.65% which shows a significant number of students willing to go abroad after they finish their undergrad degree to several ivy league universities in the US and some famous ones in the European Union.

Chart 4: Percentage of students who opted additional coaching classes from 1st to 12th grade



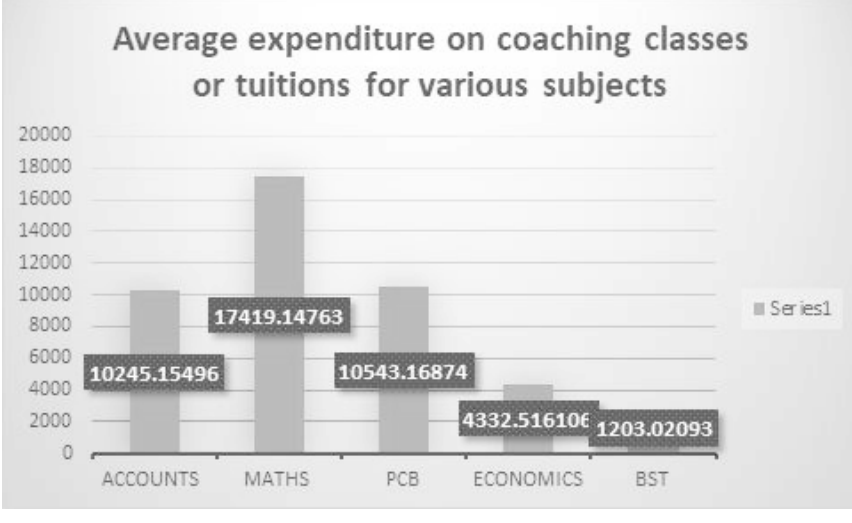
Source: Sample survey of 169 students conducted by the authors of this research paper

Chart 5: Distribution of average expenditure incurred on additional classes amongst various subjects (pie chart)



Source: Sample survey of 169 students conducted by the authors of this research paper

Chart 6: Bar graph on average expenditure incurred on additional classes for various subjects



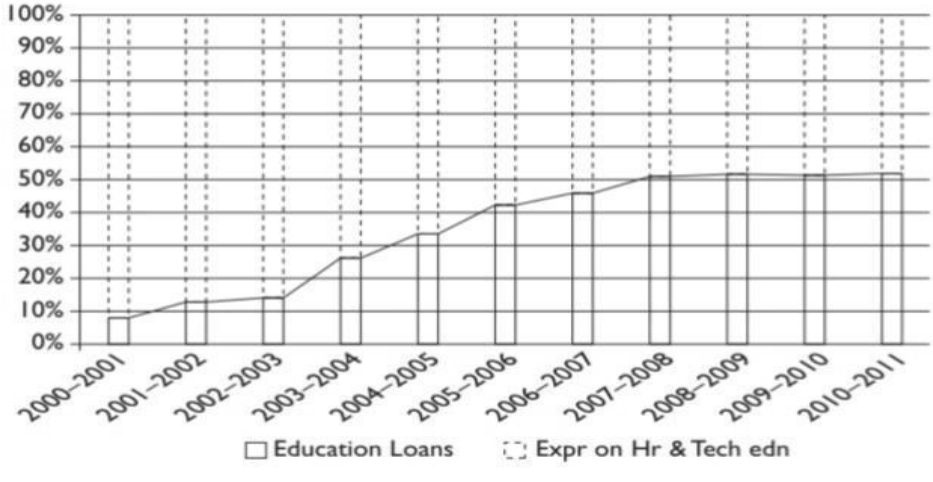
Source: Sample survey of 169 students conducted by the authors of this research paper

Table 6: Growth in Education Loans and Enrolment in Higher Education in India during 2000–2001 to 2010–2011

	Total No. of Education Loans (in 000s)	Total Enrolment (in 000s)	% of Students Obtained Education Loans
2000–2001	112	8,626	1.3
2001–2002	157	8,821	1.8
2002–2003	239	9,517	2.5
2003–2004	347	10,009	3.5
2004–2005	470	11,777	4.0
2005–2006	641	14,324	4.5
2006–2007	1,002	15,553	6.4
2007–2008	1,215	17,211	7.1
2008–2009	1,603	18,649	8.6
2009–2010	1,928	20,741	9.3
2010–2011	2,236	23,078*	9.7
2011–2012	2,288	25,678*	8.9
Growth rates	33.5	11.2	

Source: Statistical tables relating to Statistics in India, Selected educational Statistics for the period 2000–2001 to 2005–2006; Selected Statistics on Higher and Technical Education since 2006–2007. Note: * indicate projected figures using the average annual growth rate in the enrolment of higher education during the period 2000–2001 to 2009–2010.

Chart 7: Growth of Education Loans Sanctioned and Expenditure on Higher and Technical Education



Source: Statistical tables relating to Statistics in India; Analysis of Budgeted Expenditure on Education, various issues

Table 7: Growth of Education Loan and Government Expenditure on Higher and Technical Education during 2000–2001 to 2010–2011

	Education Loans Released (₹in 10 millions)	Government Expenditure on Higher & Technical Education (₹in 10 millions)	Education Loan as a % of Government Expenditure on Higher and Technical Education
2000–2001	1,028	11,723	8.8
2001–2002	1,527	10,648	14.3
2002–2003	2,870	17,719	16.2
2003–2004	4,179	11,893	35.1
2004–2005	6,398	12,649	50.6
2005–2006	10,804	14,670	73.6
2006–2007	14,012	16,583	84.5
2007–2008	19,748	18,969	104.1
2008–2009	27,646	27,190	106.9
2009–2010 (RE)	35,628	33,647	105.9
2010–2011 (BE)	43,074	39,798	108.2
2011–2012 (BE)	42,993	–	–
Growth rates	42.8	12.60	–

Source: Statistical tables relating to Statistics in India; Analysis of Budgeted Expenditure on Education, various issues.

Table 8: Who Benefits from Government Financing of Higher Education

		Location		Gender		Caste Groups		
MPCE	National	Rural	Urban	Male	Female	SC/ST	General	Others
Quintile 1	4.1	6.79	5.58	4.85	3.10	6.51	5.65	2.02
Quintile 2	7.6	9.43	9.53	8.43	6.56	10.23	9.99	4.94
Quintile 3	13.0	12.55	15.64	14.28	11.42	16.28	15.64	9.91
Quintile 4	23.1	20.42	26.95	23.31	22.84	23.16	25.24	21.72
Quintile 5	52.2	50.81	42.31	49.13	56.07	43.81	43.48	61.42
All	100	100	100	100	100	100	100	100
Polarization ratio	12.79	7.48	7.58	10.12	18.07	6.73	7.70	30.47
N	5,047	1,856	3,191	2,823	2,224	1,075	1,541	2,431

Source: Estimated from the Basic data of NSSO 64th round.

Having divided the whole society representing monthly per capita consumption expenditure (MPCE) into 5 quintiles, it can be seen that the quintile 5 or the top most quintile was the one which gained the maximum and quintile 1 shared the least amount of expenditure on education.

To analyse whether the amount of expenditure the government has incurred could benefit the poorest sections of the society. , we have made use of the **polarization ratio** to understand if the poor are really getting benefitted out of the education loans financed by the government. The polarization ratio helps in finding by how much do the rich exit from public provisioning of education to the private sector and how much is left for the poor. The lower the ratio, the better it is for the poor in being able to access education facilities. The ratio was found to be higher indicating maximum benefits reached to the urban students than to the rural students.

This shows how poor the government programmes are targeted.

Table 9: Average Size of Education Loans in India during 2000–2001 to 2011–2012

Year	Education Loan Per Student (in ₹)
2000–2001	91,786
2001–2002	97,261
2002–2003	120,084
2003–2004	120,432
2004–2005	136,128
2005–2006	168,549
2006–2007	139,840
2007–2008	162,535
2008–2009	172,423
2009–2010	184,759
2010–2011	192,679
2011–2012	187,919
Growth rates	6.94

Source: Statistical tables relating to Statistics in India, Analysis of Budgeted Expenditure on Education

ANALYSIS

Microeconomic Aspect

As per the sample survey results, we understood that many students are forced to take educational loans due to the increasing cost. A question pertaining to the expenditure incurred on education was incorporated in the Survey. From the sample expenditure so received we conducted a z-test and used the techniques of inferential statistics to understand where the population expenditure for school education lies for the middle class and upper middle-class data per year. Due to data constraints, the poor and higher class have been excluded.

Few assumptions have been taken for simplifying purposes. The average expenditure (in Indian rupees) incurred has been taken from the three brackets of 0-50,000, 50,0000-1,00,000 and more than 1,00,000 which are 25,000, 75,000 and 1,25,000 respectively. The results strongly indicated that population expenditure for the middle section of the society lies at about Rs. 65,687.09 to Rs. 82,223.67 per year which is on the expensive side of the scale. Middle income people comprise 55% of the population. Education is seen as a heavy expenditure, pushing them to take up more loans due to insufficient funds.

We also asked certain questions regarding the institute where they wished to pursue their education if they chose to go abroad, whether they were willing to take loans to continue with higher education, whether they preferred Government schools/colleges. Out of the sample survey we found 39 valid responses that were suitable to be incorporated in the study. Responses were divided under 6 important categories. Nearly 40% to 70% of the middle income and upper middle-income population wish to pursue their undergraduate education in India (values derived from t-tests) but would like to go abroad for higher studies due to the poor system prevalent in India. Most of them also agreed to the fact that they would have stayed in India had the education system been good.

We also have tried analysing the responses that we got regarding the excess expenditure incurred by students for taking up additional classes besides

college or school education. After taking into account the inflation, we got the following results.

We realized that Maths was the subject which people often took classes for, then was Accountancy and then Physics, Chemistry and Biology. Another point to be noted is that although the demography of the people from whom the survey was taken from commerce major students, Maths being a common subject for both science and commerce, showcased the fact that the education system of India doesn't provide absolute justice to what it stands for as the "Land where Mathematics was developed"

Among the major reasons that we found as to why people took coaching classes was the fact that their teacher either wasn't good or they felt the need of studying again with an external support factor.

Increase in educational loans can be seen as a positive aspect but the fact that the rise comes from the increase in demand by people in the middle class who do not have sufficient collateral is an important factor which drives NPAs higher. Waving off their loans would definitely relieve them from the burden but if it really would incentivise such people to invest somewhere leading to the development of the economy is a question that we seek to look into.

After thoroughly understanding the data, we understood that in the short-term there might be temporary benefits but not substantial ones. The unemployment rate at the time of graduation tends to have a long-term impact on lifetime earnings and health. Good education is also seen as an indicator of a lower likelihood of unemployment, success, in both the labour and marriage markets, happier marriages, more successful children, more civic participation, more welfare, better health, enhanced decision-making skills and decreased risky behaviours.

With increasing concerns about student loan debt and the defaults, researchers and policymakers are now beginning to realize these short-term impacts that extend beyond simply defaulting or the ability to repay the debt. The effects of student loan debt on health, financial capability, transitions to adulthood such as marriage and homeownership, and wealth accumulation are the key factors that noted substantial change.

When compared to students having low financial concerns to those with high financial concerns, it was seen that anxiety and nervousness levels were more for students with high financial concerns and they faced more criticism by people, and they had more difficulty sleeping. Drinking and driving, amphetamine use, condom use, depression, physical inactivity, and a higher BMI were significantly associated with high-risk credit behaviour.

Macroeconomic Aspect

After having tried to understand the secondary data, we found a few strong implications that educational loans have on society.

From the polarization figures we found that there is inequality in the loans that have been granted. Urban students are the ones who are gaining the most. Hence government, due to its inability to benefit poor students and finance the increasing social demand for higher education, has innovatively shifted from provision of public subsidies such as grants-in-aid, block grants and maintenance grants, to performance-based grants, efficiency-related grants, outcome-based grants, etc, and from the provision of public subsidies of grants/scholarships, tuition subsidies and cost of living subsidies, to voucher schemes and education loans.

But, the conversion of a loan into a grant can affect the financial viability of the student loan scheme. It would be criticised on the basis that such conversion can have drastic effects on the health of the banking system and will contribute to multiplying the non-performing assets (NPAs). The establishment of credit guarantee fund scheme, which provides a guarantee for education loans disbursed by Indian banks under the model framework of education loan scheme by Indian Banking Association, helps in easing this situation.

Every scheme that the government specifies has an objective which is driven by several factors such as the interest charged, collateral requirements, eligibility to get loans, amount recovered, repayment period, grace period etc. Better schemes and structures are being introduced to ensure full recovery of the loans. Recovery is a way forward for the government to give more loans and more waive offs to those who are actually in need of it.

Like the hidden component in the National Student Loan Scholarship Scheme is the grant (low recovery ratio) compared to the loan component. When we talk about the structure of the New Educational Loan Scheme, 2001, the main focus is on **maximum recovery**. The government has actively been thinking of ways to increase its receipts to further boost the economy.

Despite the comprehensive plans that focus on maximum recovery of loans, it is evident from the past that the rate of non-repayment of educational loans in the banking sector has been increasing.

There can be various reasons for non-repayment of loans such as income shocks, that are beyond the control of the households and asks for government intervention to ease temporary resource constraints. Default can also be due to moral hazard which creates inability to pay resulting from unproductive expenditures incurred by the households. However, one of the major reasons is the financial hardship faced by students.

Tuition fees of educational institutions at various levels have been rising tremendously and continue to rise more rapidly than the rate of inflation.

It has also been observed that human capital investment made in the developmental stage and at later stages is complementary in nature rather than substitutable i.e. an increase in investment in developmental stage would simultaneously increase the investment in later stages rather than decreasing it. So, there is a gradual increase in educational expenditure.

Data also shows that 67% of students attend private institutions which has led to an increase in the total number of admissions in private institutions. Since, private institutions charge higher fees than government institutions, there is a need for financial assistance. And hence, financial assistance from parental transfers, grant aid, or student loans has become critical for college completion. But, parents invest their resources in their children based on their socioeconomic status and educational expectations. If the parents are unable to contribute well financially, the children face increased difficulties in financing their education. This leads to an increase in demand for external financial aid.

Due to this, 71% of Indian students and their parents are ready to go into debt

for financing their college education believing that there are positive returns to education and the student will be able to repay the debt.

Students always consider education loans as a means to make their desired career rather than a form of debt. Parents shape the students' attitudes toward this debt. The fear of debt and debt utility, both are associated with how debt was described.

But, an educational loan waiver by the government implies that the government settles the private debt that a student owes to a bank. Doing so eats into the government's resources, which, in turn, leads to one of following two things: either the concerned government's fiscal deficit (or, in other words, total borrowing from the market) goes up or it has to cut down its expenditure.

A higher fiscal deficit, even if it is at the state level, implies that the amount of money available for lending to private businesses — both big and small — will be lower. It also means the cost at which this money would be lent (or the interest rate) would be higher. If fresh credit is costly, there will be fewer new companies, and less job creation.

If the state government doesn't want to borrow the money from the market and wants to stick to its fiscal deficit target, it will be forced to accommodate by cutting expenditure. More often than not, states choose to cut capital expenditure — that is the kind of expenditure which would have led to the creation of productive assets such as more roads, buildings, schools etc — instead of the revenue expenditure, which is in the form of committed expenditure such as staff salaries and pensions. But cutting capital expenditure also undermines the ability to produce and grow in the future.

Furthermore, whenever the government waives off loans at a large scale, it comes with various implications on households. There have been certain economists who were in favour of government intervention via fiscal channels during exceptionally harsh economic circumstances. One argument in favour of fiscal stimulus programs which operates through credit markets assumes that in situations where households are facing severe macroeconomic shocks and they are unable to manage their finances, then

such policies will prevent excessive dead weight losses from foreclosure. Another argument rests on the premise that these economic stimulus programs may distort borrower incentives and ultimately lead to moral hazard.

In the past, the council of ministers at the centre had waived off the interest on educational loans availed from scheduled banks during the moratorium period (i.e. upto one year after the course or six months after getting of job whichever is less) for students of families with annual income less than Rs.4.5 lakhs from the 2010-11 academic year. This one-time relief was available for students who secure admission for technical and professional courses after plus two. But the overall economic impact of this scheme was extremely less.

Hence educational loan waivers are not prudent enough in the long run because they hurt overall economic growth apart from ruining the credit culture in the economy since they incentivise defaulters and penalise those who pay back their loans. The costs that the government bears are more than benefits that an individual students get in terms of less burden.

As per a study conducted by ASSOCHAM, the percentage of student loan borrowers belonging to middle class families has been less than 3% in India whereas the same percentage is 85% in the UK, 70% Germany and France, 77% the US. Hence even if the government does waive off, it is only the 3% who are benefited. But this doesn't mean we ignore educational loans completely. Bringing about a drastic change in how the education system functions can improve the job market leading to lower NPAs and giving out loans to the more needy and thereby equalising the whole system.

CONCLUSION

After having understood the Indian education system, we have realised that the vicious cycle in which a student gets trapped is the main reason behind increasing NPAs of educational loans. Granting and waiving off loans is only a facade to the real problem lying behind.

The scheme of granting loans and the model used by the Indian Banking Association should exclusively focus on those who are actually in need of funds. Programs should be implemented effectively and should target the

prospective recipient of benefit. There will definitely be a trade-off between seeking equality in granting loans and reducing NPAs in the short run, but in the long run building the right education system will ultimately help us solve both the problems.

Through the cost and benefit analysis of waving off loans in our paper, we have concluded that costs outweigh the benefits. In the short run, the betterment of health and mental peace is given but that in turn is not sufficient enough to reap economic benefits. In fact, the losses that the government bears (increasing deficit) are far more than the advantages. The opportunity cost of waiving off is really high. The only solution to this problem is to firstly bring about a paradigm shift in the education system which requires a good amount of initial investment.

We recommend spending at least 6% of the annual budget on education. In reality the allocation has been around 3.1% of GDP. Out of this, Rs.39,466 crore has been spent on higher education, which is definitely not enough to solve the education loan crisis. A two-way system of spending 40% funds in loans and remaining 60% on new investments in education is a simple step forward in the beginning, and later the ratio can be changed.

We also analysed our survey results by conducting T-tests and F-tests, which further testifies to the poor system that we have in hand. Tests indicate that major students among the middle-income group are willing and in reality, going abroad to pursue their education. A setback to the government given the fact that best brains are moving out of the country.

After having revamped the education system we can expect expenditure to be low not only in terms of actual or primary educational classes but also the additional classes taken up, more students getting employed, and lower creation of NPAs of educational loans. Waiving off educational loans seems definitely a good move in the short term especially during the pandemic but it is not a long-term solution. Problems will persist until the roots of education are strengthened. Motivation to deviate the odds, trying hard to become job givers rather than becoming job seekers can be instilled only if we impart knowledge effectively and efficiently. Good education system will lead to better life, increased earning capacity, lower NPAs, more investments and ultimately increased GDP.

"If you give a man a fish, you feed him for a day. If you teach a man to fish, you feed him for a lifetime."

REFERENCES

- 2019, Education loans, Loans, Punjab National Bank, https://www.pnbindia.in/education.html

- India CSR Network, 2019, IBA education loan scheme to provide financial support to students, https://indiacsr.in/iba-education-loan-scheme-to-provide-financial-support-to-students/

- We Make Scholars, 2021, SBI Educational Loans, https://www.wemakescholars.com/sbi-education-loan

- Dinesh Unnikrishnan, 2020, Why have Indian banks stopped lending to students?, Money Control, https://www.moneycontrol.com/news/economy/policy/why-have-indian-banks-stopped-lending-to-students-4862821.html

- Susan Dynarski, Professor, University of Michigan; Nonresident Senior Fellow, the Brookings Institution; Faculty Research Associate, National Bureau of Economic Research, 2014, An Economist's Perspective on Student Loans in the United States ES Working Paper Series, Economic Studies At Brookings, https://www.brookings.edu/wp-content/uploads/2016/06/economist_perspective_student_loans_dynarski.pdf

- Minu John, 2016, Current Scenario in Education Loans in India, Research Gate, https://www.researchgate.net/publication/301798733_Current_Scenario_in_Education_Loans_in_India/link/5eba552c92851cd50dab61fb/download

- Tanika Chakraborty and Aarti Gupta, Efficacy of Loan Waiver Programs, IIT Kanpur, https://home.iitk.ac.in/~tanika/files/research/LoanWaiverAT.pdf

- Manoj PK and Varghese KX, 2012, A Review of Educational Loans Disbursed, Research Gate, https://www.researchgate.net/publication/

280566302_A_REVIEW_OF_EDUCATIONAL_LOANS_DISBURSED_DURING_FY_2005-2011/link/55ba24a708aec0e5f43e8cdc/download

- Geetha Rani, 2014, Education Loans and Financing Higher Education in India: Addressing Equity, Research Gate, https://www.researchgate.net/publication/273461842_Education_Loans_and_Financing_Higher_Education_in_India_Addressing_Equity

- Shilpa S, Easwaran S and S. T. Janetius, 2013, Bad Loans and Wilful Defaulters: A Study on Unconventional Reasons for Non-payment of Education Loan by Rural Graduates, Research Gate, https://www.researchgate.net/publication/241279184_Bad_Loans_and_Wilful_Defaulters_A_Study_on_Unconventional_Reasons_for_Non-payment_of_Education_Loan_by_Rural_Graduates

- Soo Hyun Cho, Yilan Xu and D. Elizabeth Kiss, 2015 Understanding Student Loan Decisions, Research Gate, https://www.researchgate.net/publication/272240931_Understanding_Student_Loan_Decisions_A_Literature_Review

- C. P. Chandrasekhar and Jayati Ghosh, 2020, Unaffordable Education in the New India, International Development Economics Associates: https://www.networkideas.org/featured-articles/2020/12/unaffordable-education-in-the-new-india/

- Claudia Sahm, 2020, Forgiving Student Loans Is Not a Lasting Solution, BloombergQuint: https://www.bloombergquint.com/gadfly/personal-wealth-forgiving-student-loans-is-no-solution

- Anna Helhoski, 2020, 10+ Student Loan Forgiveness Programs That Discharge Loans, NerdWallet, https://www.nerdwallet.com/article/loans/student-loans/student-loan-forgiveness

- Rebecca Lake, 2021, Will student loans be forgiven in 2021?, Fox Business, https://www.foxbusiness.com/money/student-loan-forgiveness-2021

- Hillary Hoffower and Madisson Hoff, 2021, The case for cancelling student debt isn't political - it's practical, Business Insider,

https://www.businessinsider.com/economic-benefits-of-student-debt-forgiveness-2020-12

- Noah Smith, 2020, Forgiving Student Debt Isn't a Great Stimulus Plan, Bloomberg Quint, https://www.bloombergquint.com/gadfly/forgiving-student-debt-won-t-do-much-for-the-economy

- Terri Williams, 2020, 10 Ways Student Debt Can Derail Your Life, Investopedia, https://www.investopedia.com/articles/personal-finance/100515/10-ways-student-debt-can-destroy-your-life.asp

- Sylvain Catherine, 2020, The Distributional Effects of Student Loan Forgiveness, Chicago Booth, Becker Friedman Institute, https://bfi.uchicago.edu/insight/research-summary/the-distributional-effects-of-student-loan-forgiveness/

- Office of Higher Education, 2017, Facts about Undergraduate Borrowing, https://www.ohe.state.mn.us/mPg.cfm?pageID=1342#:~:text=Nearly%2070%20percent%20of%20undergraduates,and%20family%20expected%20contribution%20responsibilities.&text=Although%20the%20percentage%20of%20students,groups%20take%20out%20student%20loans.

Role of Monetary and Fiscal Policies during Covid-19: India and Comparative Analysis

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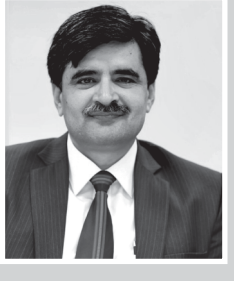

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ABSTRACT

This paper focuses on analysing the role played by Monetary and Fiscal policies during the pandemic caused by COVID-19. The paper highlights the impact of countrywide lockdown on different sectors of the Indian economy, ranging from agriculture to financial sector, and the corresponding monetary and fiscal measures adopted to avoid the disruptions in economic activities. Furthermore, the economic performance of the country is analysed during the financial year 2020-21, highlighting the V-shaped recovery, revenue and expenditure patterns, inflation and employment, and social infrastructure. Comparative analysis is done between India and three other countries, namely China, United Kingdom and United States of America, in terms of the policies and measures

adopted during the pandemic and how successful these have been in tackling the situation.

Keywords: Policy, Monetary, Fiscal, COVID-19, Lockdown, Economic Analysis

INTRODUCTION

COVID-19 is a disease caused by a strain of coronavirus and was first identified in China (Wuhan City). It was reported to the WHO on 31 December 2019, and on 11 March 2020, the WHO announced the episode a worldwide pandemic. "A pandemic occurs when a disease that people are not immune to spreads across large regions". The virus is transferred via direct contact with the respiratory droplets of an infected person. People can likewise be infected from contacting surfaces polluted with the virus and touching their face (e.g., nose, mouth, eyes).

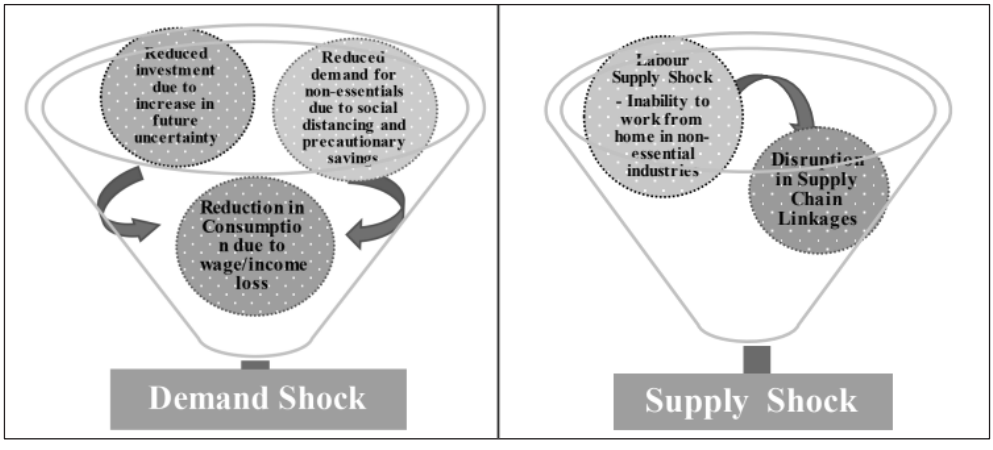
The first COVID-19 case in India was reported on 30 January 2020, after which the cases continuously increased in the country. On 24th March 2020, the Government of India announced 21 days nationwide lockdown, which was later stretched to June 2020 (RBI, Annual Report, dated Aug 25, 2020). Similar actions were taken by other countries in the world which fragmented the world economy into million pieces. During the covid-19 period both the private sector and public sector were struggling. Support from the government and the central bank of the country was the only option left with the economy.

During any crisis, two types of shocks operate in the economy: aggregate demand reductions and supply-side disruptions (as shown in figure 1). Corresponding to the shocks, macroeconomic policy responses are typically of two types: (i) Expansionary monetary policy and (ii) Expansionary fiscal policy.

Both Monetary and Fiscal policies have been used to regulate economic activity and accelerate growth during this economic slowdown. Fiscal policy refers to the use of government revenue and expenditure policies to influence the economic environment of a country, mainly macroeconomic conditions, including employment, inflation, aggregate demand for goods and services, and economic growth. On the other hand, Monetary policy

refers to the steps undertaken by a nation's central bank (Reserve Bank of India in case of India) to manage money supply and achieve macroeconomic goals that promote sustainable economic growth. This is generally done with reduction in policy rates, reserve ratios and/or expansion of money supply

Figure 1: Twin Economic Shocks by the Pandemic



(Source: Economic Survey 2020-2021)

This paper tries to analyse the government's Fiscal policies and central bank's monetary policies during this pandemic year 2020 and how effective these measures were for the economic recovery, areas requiring immediate attention by the government and what else could have been stressed upon.

LITERATURE REVIEW

The literature reflects that the COVID-19 pandemic has brought in immeasurable macroeconomic uncertainty. Many have termed it as a humanitarian crisis and in fact, a World War III. Now, the nation is facing a mammoth task of saving both "lives" and "livelihood" of people.

(Arunika Agarwal, David E. Bloom, and Anita Shet, 2020) in their study suggest that the COVID-19 pandemic has posed multiple challenges before the Indian government- in terms of health and socio-economic effects- both direct and indirect. The degree of the impact will vary from temporary to long term. Under such a pandemic situation, the only promising thing that can provide immunity to the people and the economy is the safe and effective

vaccine. Until this happens, there is a need to continue with wearing masks, social distancing, and washing hands, as well as focusing on ramping up public health infrastructure and reaching out to vulnerable populations, to help India get back on the road to improve its population health.

(Lekha Chakraborty and Emmanuel Thomas, 2020) points out that the macroeconomic uncertainty developed by COVID-19 is difficult to measure. The situation requires aggressive policy interventions in fields of health infrastructure, livelihood and humanitarian issues developing due to migration of workers. Although India has announced its measures, more fiscal and monetary policy measures are required to scale up the policy responses to "whatever it takes" level. Innovative sources of financing the deficit, including "money financing of fiscal programme"—a variant of helicopter money—can be a solution. Breaching the Fiscal Responsibility and Budget Management Act, 2003 by raising the threshold deficit– GDP ratio from 3% is significant, with a clear "excessive deficit procedure road map" as the post-COVID-19 exit strategy. The government as the employer of last resort with an effective rise in the existing wages could be an effective component of this policy.

(Maurice Kugler and Shakti Sinha, 2020) points out that the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA) and supply of highly subsidized food grains during the period of lockdown have acted as saviour in keeping unemployment rates down and ensuring social stability. 36 million people were employed under MGNREGA in May 2020. This increased to 40 million in June 2020. However, MGNREGA has a limit of maximum 100 days guaranteed employment and it does not cover urban areas. Therefore, India needs to ramp up MGNREGA, introduce a guaranteed urban employment scheme, add a greater number of guaranteed employment days and increase further cash transfers to poor households for their better survival.

(N R Bhanumurthy and O.P.C. Muhammed Rafi, 2020) highlights that under the Atmanirbhar Bharat package, the monetary support is expected to be around 8% of GDP. Monetary policy transmission through rate cuts has improved substantially, though focus should be more on the credit channel, as it comes out to be more effective than the interest rate channel. Thus, the

window of one-time restructuring of some stressed assets will aid the banking sector in enhancing credit flow. According to expert views, while these measures would try to boost the demand in the economy, there could still be some response delays from the supply side. This means that while both demand and supply will be lower than before the pandemic, Monetary and fiscal measures might succeed in stimulating demand more than the supply, and may lead to inflationary pressures in the economy.

RESEARCH METHODOLOGY

- Collection of secondary data on policies and measures through online websites, research articles, government publications, etc.
- Used the official Websites of RBI, Federal Reserve, IMF, World Bank, OECD, etc for collection of data on economic performance and growth in FY21.
- Analysis of Data – Compared the economic performance of India with that prevailing in other nations (China, UK, USA). We analysed the monetary and fiscal policies adopted by these governments, and studied their impact and role in economic revival.

OBJECTIVES OF RESEARCH STUDY

- To study the impact of pandemic on different sectors of the economy
- To analyse the role of Monetary and Fiscal policies in economic recovery and growth
- To study the comparative position and progress of India with China, UK and USA

SECTORAL IMPACT

We begin by looking at the impact of COVID-19 on various sectors of the economy, so as to build a better perspective in terms of affected areas and required policy stimulus.

Trade

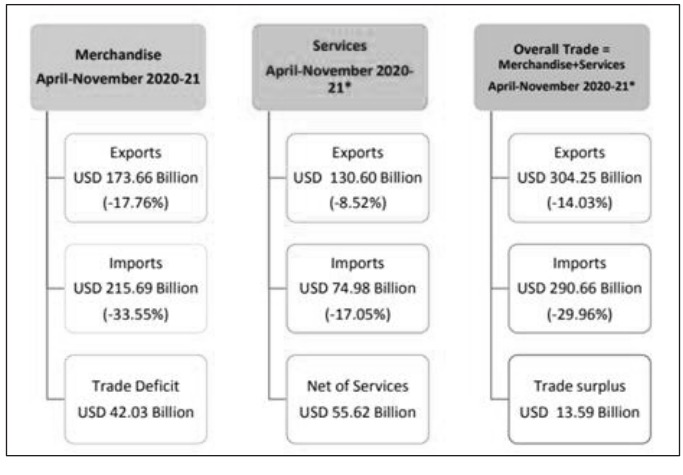
India's exports during March 2020 represented $21.4 billion, contacting a multi-year low (according to the Ministry of Commerce). As the lockdowns started in countries, worldwide demand fell sharply and trade contracts were cancelled as the supply chains were disturbed. In the shipping business, delivering lines needed to change ports of call due to restrictions from various countries, with additional stockpiling of compartments at few ports as neighborhood supply chains broke down around the world.

Table 1

Sectors	Contribution to India's exports	Risk
Materials, Clothing, and Transportation	18%	Highest
Fuels, Chemicals, Stone and Glass	40%	Moderate
Vegetables, plastic, rubber, animals, food products, etc	Low reliance on exports	Low

In the case of imports, the overall low costs of crude oil, India's biggest imported item, kept external fluctuations low. The economic impact during the pandemic has been from both demand and supply shocks.

Figure 2: India's Foreign Trade, April-November 2020-21



(Source: RBI, 15 December 2020)

Manufacturing

In many sectors, MSMEs were already facing a pre-lockdown decline in business because of economic stagnation and disruptions in market demand and global supply chains. With the onset of a pandemic, industries including electronics, automotive, pharmaceutical, and aircraft manufacturing faced raw material issues. As the lockdown began, semi and unskilled workers migrated back in large numbers to their hometowns.

The economy contracted by 7.5% in Q2 (July-September), as compared to a 23.9% fall in Q1 (April-June), exhibiting some recovery signs in the manufacturing sector. Furthermore, the easing of lockdown restrictions, along with the improvement in market sentiments, supported an increase in production activity. As per the Ministry of Statistics and Programme Implementation, the manufacturing sector recovered from a 39.3% contraction in the Q1 to a 0.6% growth in Q2.

Construction & Infrastructure

Before the pandemic, there was a fall in liquidity due to rising levels of NPAs in financial institutions and the NBFC crisis, and thus capital was not being readily available for all types and sizes of builders. Then, the restrictions that came with the lockdown prevented work on ongoing projects. These delays and disruptions increased costs and losses and brought the construction industry to a sudden halt. All construction activities and supply of raw materials were stopped and because of the uncertainty, workers migrated back to their hometowns.

In Q2, 2020 there was a 50.3% drop in demand and overall, the industry is likely to shrink by 14.9% in 2020 as compared to 2019 (Construction Week Online, 09 Sep 2020). The S&P BSE India Infrastructure index lost almost 35% value between Jan-March 2020 and the effect still continues. A big push to this sector is likely to come from the government through its mega projects lined up in the National Infrastructure Plan, along with the Affordable Rental Housing Complex (ARHC) scheme of the Pradhan Mantri Aawas Yojana – Urban. In this way, the housing construction industry will attract a significant portion of government investment.

Service Sector

The service sector contributes about 55% of India's economy and nearly 1/3rd of its jobs. Reductions in both inflows and activities were observed as lockdown restrictions stifled demand and forced companies to cease operations. According to the Purchasing Managers Index-Services (Nikkei/IHS), India's services improved only at 34.2 points in July'20 from 33.7 in June'20. Even after easing restrictions, people still remain cautious about discretionary spending as well as health and safety.

-Restaurants

The National Restaurant Association of India (NRAI) had advised its members to shut down operations from March 2020. As per a CRISIL report, "India's organized dine-in restaurants are on course for a 40-50% cut in revenue this fiscal because of the disruptions caused by COVID-19 pandemic, which have led to outlet closures, job cuts and trickle-down effect on the food supply chain."

-Hotels

Tourism constitutes about 10% of India's GDP. The topmost concern post-Covid-19 will be on the health and safety issues of the hotel. "According to JLL's Hotel Momentum India (HMI) report, the Revenue Per Available Room (RevPAR) across markets has fallen 52.8 year-on-year in the January to September 2020 period."

-Public Transport

Public transport has not witnessed a good recovery, thus reducing government revenue collections. This is because COVID-19 may have a long-term impact on people's travel behaviour, as now the preferred mode of transport will be influenced by safety concerns, and hence public transport would be the least preferred mode.

-Retail & Ecommerce

The major segments of E-commerce are healthcare segment (31%), the food

and beverage sector (19%), and the household and personal care products (50%). In the current pandemic scenario, consumers mostly preferred the online mode of shopping. Daily essentials categories saw a massive increase in searches (200%), whereas Lifestyles sales witnessed a fall between 15%-30% because of an increase in consumer price sensitivity. The digital world also got a big push as a result of E-commerce, even small retail stores are now using online payment apps like Phone pay and Paytm.

-Education

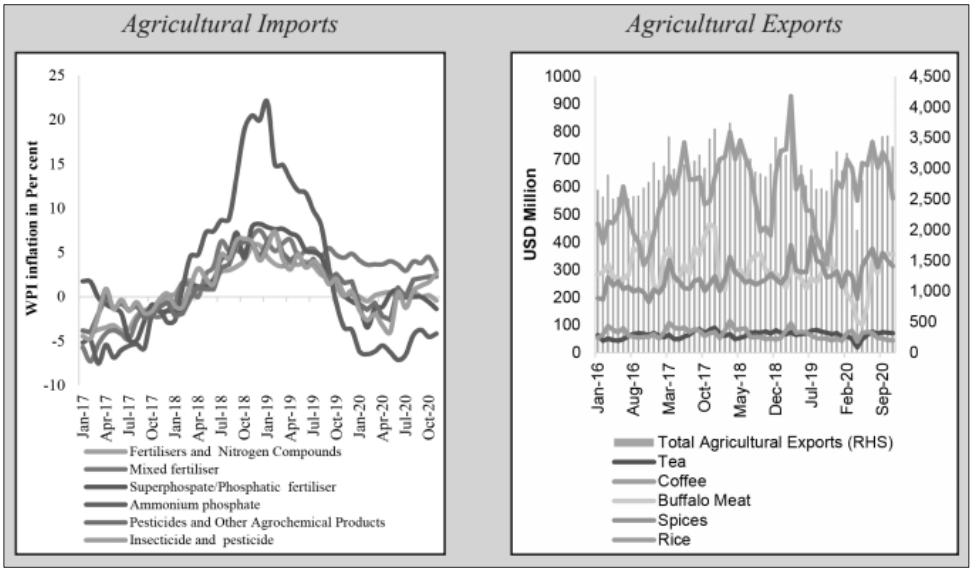
The education sector saw a drastic change in terms of digital education., with the schools and colleges conducting their routine classes digitally from homes. Even services like fee payments, online exams, college library, etc were online during this pandemic. Thus, this crisis has also brought to light the need of investing in technologies, cyber security, and e-governance.

Agriculture

As the GOI announced nationwide lockdown in March 2020, the economy came to a halt, but still, the food prices stabilized for most of the agricultural goods; though delivery channels were impacted. By June, the goods started arriving at mandis at rates as before. The economy didn't face any shortage of food grains, fruits, and vegetables, and thus there wasn't panic among consumers to stock these commodities in large quantities.

The Finance Minister announced a 1.7 trillion package, so as to protect the sections more prone to adverse effects of the Corona pandemic, especially the farmers. This was done through direct bank transfers of Rs2000 to accounts of farmers as part of the PM-KISAN scheme.

Figure 3: Impact of COVID-19 on Agriculture and Related Activities



(Source: Economic Survey 2020-21)

Healthcare

"*In terms of access and quality of health services, India was ranked 145 out of 195 countries in a Lancet study published in 2018*" *(Indian Express)*. The Indian Healthcare sector includes hospitals, diagnostic centers, medical practitioners, medical tourism, health insurance, medical equipment, and wellness chains.

-Medical Tourism

Approximately, medical tourism forms 35% of private hospitals' revenue. "India witnessed a footfall of 0.697 million foreign patients on a medical visa in 2019 which accounts for 6.9% of total foreign tourist arrivals and USD 3 billion markets for India" (Financial Express). But in the post-covid era, the sector came to a standstill, which made the private hospital business highly financially unstable. This happened because of the travel breakdown in the world, a record decline in airline demand, closure and shut down of medical tourism agencies, widespread financial hardships among many industry key players and no foreseen resolution to COVID-19 fears.

-Medical Equipment Industry

During the pre-covid phase, India was highly dependent on imports from China, America, and other countries for the supply of medical equipment. The GOI through its flagship initiative 'Aatma Nirbhar Bharat' relied heavily on domestic manufacturers to meet the demand. Before the outbreak, only 20 domestic firms were manufacturing 62 lakhs PPE kits per year, but within 2-3 months, the number of manufacturers listed with AIMED (Association of Indian Medical Device Industry) increased to 140 with 25.55 crores annual capacity. Similarly, as of October 2020, the number of Indian ventilator manufacturers went up from 8 to 17, mask manufacturers from 30 to 108, swab manufactures from zero to five, and sanitizer manufacturers from 35 to 49 and RT PCR kit manufacturer from 0 to 8.

-Health Insurance

The Health Insurance industry has witnessed massive growth and shifts towards digitalization. In the first half of 2020-21, for the first time in the last 20 years, health insurance became the most important part for non-life insurers in terms of premiums collected with a y-o-y development of 15.8%. "According to the General Industry Council, health insurance accounted for 29.7% of premiums collected by non-life insurers in the first half of 2020-21" (Live Mint).

-Pharmaceutical Companies

"*The Indian pharmaceutical industry is the world's 3rd largest drug producer by volume and the country's market manufactures* 60% *of vaccines globally*" *(Europeanpharmaceuticalreview.com)*.

Indian manufacturers rely heavily on APIs (Active Pharmaceutical Ingredients) from China**.** Due to Covid-19, the supply chain disruptions restricted the supply of APIs for the Indian pharma companies and on the other hand, export restrictions disrupted the sales of Indian medicines. Currently, the government of India is taking steps in direction of domestic production of APIs to reduce its dependence.

Finance sector

-Banking

If we talk about digitalization then it would not be wrong to say, 'Covid-19 is an opportunity in disguise for the Indian banking sector'. Due to lockdown, it became difficult for customers to visit bank branches physically, which is likely to result in a more permanent shift in customer preferences for digital channels of banking.

Besides this, the moratorium period announced by RBI would probably result in an increase in NPAs of Indian banks. Retail and commercial banking also experienced a sharp decline in revenues due to disruptions in demand.

-Mutual Funds

Between December 2019 and April 2020, the share of *individual investors* in mutual fund assets continuously decreased, while the industry witnessed a continuous increase in the share of *institutional investors* in mutual fund assets. With the abrupt closure of Franklin Templeton's six debt funds, the distrust of investors grew up about the way forward. Thus, the mutual fund market fall was like a financial cyclone that waved away the faith and stability of Indian investors, despite miscellaneous liquidity measures taken by the Government of India.

-Insurance

In the first half of the financial year 2020-21, Health Insurance experienced a positive y-o-y growth of 16% followed by fire and liability insurance. Whereas Motor, Crop, and Personal accidents experienced negative y-o-y growth.

Also, the Insurance Regulatory and Development Authority of India (IRDAI) has designed two standardized Covid-19 health insurance policies that have to mandatorily be offered by companies.

-Stock Market

On Monday, 23 March 2020, before the nationwide lockdown was imposed,

the Bombay Stock Exchange Sensex had closed at 25,981 (23/03/20) points. But now, with the pandemic still raging, the Sensex hit 49,000 (11/01/21) points — an all-time high. The jump by the Sensex was matched by the National Stock Exchange's NIFTY 50, which rose from 7945 (23/03/20) to 14,400 (11/01/21) points, its highest-ever figure too.

The Indian stock market crashed in the initial period of the lockdown but it is rightly said that 'Stock prices try to discount the future' which means stock markets are forward-looking. So, one of the reasons why the Indian stock market index hit an all-time high can be because of the optimism about the arrival of Covid-19 vaccines and positively improved testing and treatment options.

MONETARY POLICY HIGHLIGHTS

Q1: April-June

Volatility could be seen in financial markets with panic sell-offs by Foreign Portfolio Investors (FPIs) resulting in wealth destruction in equity markets and currencies experiencing severe depreciation pressure on a daily basis. After assessing the macroeconomic situation, the Monetary Policy Committee (MPC) decided to bring down the repo rate from 5.15% to 4.40% by 75 basis points (March 27, 2020) and maintain the 4% medium-term target for CPI inflation in targeted range of -/+ 2%. The cash reserve ratio (CRR) was reduced to 3% by 100 basis points. "The repo rate was further reduced from 4.40% to 4.0% by 40 bps (May 22, 2020). The Bank Rate was reduced from 4.65% to 4.25% and reverse repo rate from 3.75% to 3.35%".

Along with existing policies, RBI announced following additional measures:

- **Improvement in market functioning:** A refinance facility of 15,000 crore was announced by the RBI to Small Industries Development Bank of India (SIDBI) at RBI's policy repo rate for a period of 90 days. With respect to the condition for investments by FPIs, that in any event 75% of allocated limits should be invested within 3 months, however an extra 3 months' time will currently be permitted to satisfy this necessity.

- **Aiding exports and imports:** The maximum reasonable time of pre-

shipment and post-shipment export credit endorsed by banks was increased from the current 1 year to 1 year and 3 months, so as to ease difficulties faced by exporters. Similarly, to provide more flexibility to importers, time for payment for imports was increased from half a year to one year from the shipment date (for exports or imports made before or up to July 31, 2020).

- **Addressing state governments' financial constraints:** Guidelines were relaxed on withdrawal from the Consolidated Sinking Fund (CSF) of State Governments to empower the states to fulfil nearly 45% of the retrieval of their borrowings from the market, due in 2020-21.

Q2: July-September

Rising cases of COVID-19 infections during July in major economies depressed signs of revival. This necessitated another set of regulatory policy to Inject more liquidity and ease financial stress.

- **Additional Liquidity Facility to Banks for Housing Sector:** "Rs 65,000 crores were allotted to National Bank for Agriculture and Rural Development (NABARD), Small Industries Development Bank of India (SIDBI), National Housing Bank (NHB) and EXIM Bank". An Additional Standing Liquidity Facility (ASLF) of 5,000 crore was provided to NHB to support Housing Finance Companies (HFCs) under the predominant conditions and enlarge the progression of money to the sector.

- **Advancing loans against Gold Ornaments and Jewellery:** According to the guidelines, advances endorsed against gold ornaments and jewellery for non-agricultural purposes could not surpass 75% of the estimation of these adornments and gems. In order to mitigate COVID-19 impact on family units, business people and small businesses, it was decided to increase this loan to value ratio (LTV) from 75% to 90%.

- **Reviewing Guidelines for PSL:** The Priority Sector Lending (PSL) guidelines were reviewed after discussions and consultations with all stakeholders, aimed at encouraging and supporting friendly lending policies to help accomplish Sustainable Development Goals (SDGs).

Q3: October-December

Looking at the evolving macroeconomic situation, the Monetary Policy Committee decided to keep the repo rate and the reverse repo rate unchanged at 4% and 3.35% respectively. The liquidity measures undertaken include:

- **Open Market operations (OMOs) in State Developments Loans (SDLs):** SDLs, along with T-bills, government securities and oil bonds, are eligible collateral for Liquidity Adjustment Facility (LAF). It was decided to undertake OMOs in SDLs to improve liquidity and facilitate efficient pricing.

- **Liquidity Management for Regional Rural Banks (RRBs):** The RRBs weren't allowed for the use of RBI's liquidity facility. However, two new measures were proposed to address these issues: "to extend the Liquidity Adjustment Facility (LAF) and Marginal Standing Facility (MSF) to RRBs, and to permit the RRBs to step in the Call/Notice money market".

- **Dividend Distribution Policy for NBFCs:** There were no provisions with regard to distribution of dividend by NBFCs, unlike banks. Considering their significance and interlinkages in the financial system, it was decided to formulate guidelines on dividend distribution by NBFCs, as per a matrix of parameters, subject to a set of generic conditions.

Analysis Note: In order to boost investments in the economy, interest rates have to be lower, and expanding the money supply solves the purpose, avoiding the costs of borrowings at the time of recession and a cash crunch. On 27th March, RBI governor Shaktikanta Das said "monetary policy needs to proactively arrest any deterioration in aggregate demand, and create enabling conditions for businesses to normalise production and supply chains".

The measures have been undertaken in the hope to push investors to make use of this opportunity to access capital at lower costs. States too have been incentivised to channel their drawing provisions with the RBI, as they are much cheaper than market loans. Monetary policy has an important role in flattening the recession curve by ensuring easy and sufficient liquidity in the economy, so that people have money to spend even if they are unemployed.

FISCAL POLICY MEASURES

The policy measures so far have been on pushing up demand and easing supply constraints, especially of essential goods. The Finance Minister announced Atmanirbhar Bharat Abhiyan packages targeted at the most vulnerable sections of the economy. The total amount of the package announced is roughly to be Rs 20 trillion (or roughly 10% of GDP). Following are some of the highlights of the fiscal programme (Source: Economic Survey 2020-2021):

- Rs 3 lakh crore collateral free loans with 100% credit guarantee cover extended to standard businesses/MSMEs
- 83% of PDS population to be covered under One Nation One Ration Card scheme by August 2020 for national portability of PDS benefits (100% by March 2021)
- LTC Cash Voucher Scheme and Special Festival Advance Scheme provided to government employees.
- Rs 18,000 crore additional outlay provided for PM Awaas Yojana – Urban
- Additional outlay of Rs 10,000 crore provided for PM Garib Kalyan Rozgar Yojana to provide rural employment

A careful analysis reveals that the actual amount of fiscal stimulus offered by the government has been around 2-3% of GDP (Sengupta and Vardhan, 2020). Various sectors have been demanding additional fiscal stimulus; thus, the welfare spending should be increased by 5% of GDP or more. For the revival of the economy, damage on households and firms has to be reduced with unemployment benefits, income support, businesses subsidies, etc. (Ila Patnaik and Rajeswari Sengupta, 7 September 2020)

The borrowing capacity of the states was increased from 3% to 5% of Gross State Domestic Product (GSDP), as a part of the Atmanirbhar package. However, increase in government spending will also lead to large fiscal deficits than planned. Such additional spending can be financed from revenues generated through disinvestments; however, the government hasn't succeeded in it till date. If the government resorts to borrowing, then

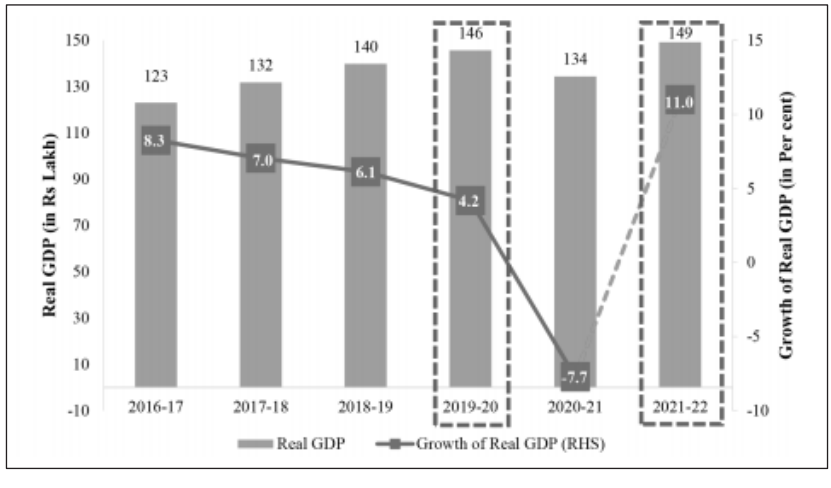
the interest payments will be higher resulting in higher debts. Thus, looking at the present fiscal scenario and necessity of spending, the government should take the steps accordingly.

ANALYSIS OF ECONOMIC PERFORMANCE

V-shaped economic recovery

Because of the severe lockdown forced during March-April, 2020, the Indian economy saw a sharp withdrawal of 23.9% in Q1 and 7.5% in Q2 of FY 2020-21. From that point forward, a few indicators have exhibited a V-shaped recovery, with the support of fiscal and monetary support and structural reforms. Overall movement of high frequency indicators indicate a fast pickup in Q2 and developing movement to levels before pandemic in Q3. As mobility in India improved, indicators like GST collections, E-way charges, rail cargo, and power utilisation arrived at pre-pandemic levels as well as outperformed earlier year levels.

Figure 4: Projections of Real GDP (2021-22)



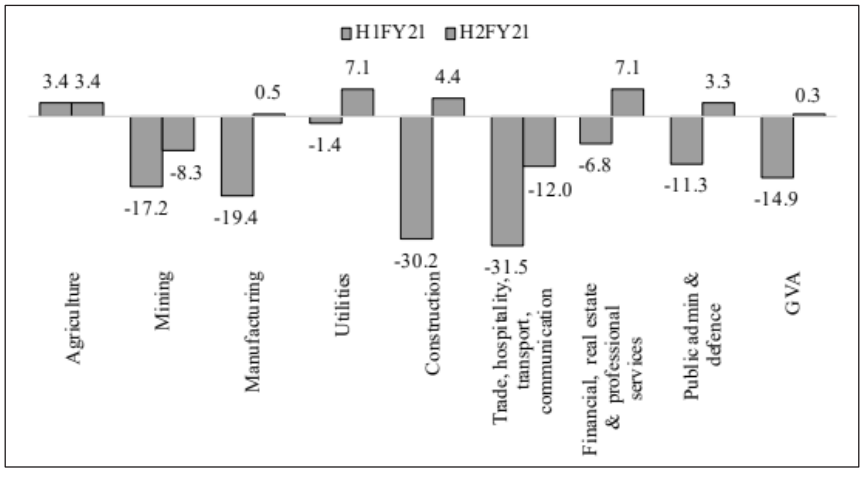
(Source: NSO and Survey Calculations)

On demand side, the greatest development driver is probably going to be Government expenditure (GFCE), with its share increasing from 12% FY20 to 14% in FY21. Private spending is likewise expected to improve essentially. "Gross Fixed Capital Formation (measure of Investment) is also expected to

recover significantly with a mild contraction of 0.8% in the second half against a sharp 29% fall in first half FY21. Net Exports turned positive in the first half of the year with a larger fall in imports of 29.1% as compared to contraction in exports of 10.7%, however with gradual revival, net exports are expected to be in the negative figures in the second half."

On the supply side, Gross Value Added growth is fixed at -7.2% in FY21 as compared to 3.9% in FY20. Just Agriculture added to positive growth (increase in GDP share from 17.8% in FY20 to 19.9% FY21), while Service and Industry added to the fall in GDP (by 9.6% and 8.8%). Following figure shows the contribution of sectors constituting GVA and their V-shaped recovery path FY 2020-21.

Figure 5: V-shaped Recovery in sectors constituting GVA (2020-21)



(Source: NSO)

The above examination shows that the economy was unfavourably affected by the emergency in Q1 of FY 2020-21, but with slow opening, increased demand during festive seasons and backing of full-scale monetary strategies, the economy consistently bounced back to pre-pandemic levels and developing assembly with earlier year's movement levels.

Revenue and Expenditure

Government faced a setback in revenue collection because of the setbacks to

economic activity and additional expenditure requirements by the government to relieve the aftermath of the pandemic on vulnerable people, businesses, and the economy in general. "The target for gross market borrowings of the Central Government was revised from the Budget estimate of INR 7.8 lakh crore to INR 12 lakh crore for FY21."

"Pressing on the accelerator while the brakes are clamped only wastes scarce fuel". With this thought process government of India's focus during the early days of the crisis was "not to waste precious fiscal resources in trying to pump up discretionary consumption". Instead, the emphasis was on guaranteeing accessibility of basics, including direct benefit transfers, emergency credits, and world's biggest food subsidy programme covering 80.96 crore recipients. As the economy opened up, India sloped up its spending stressing on stimulating more consumption and spending.

Additionally, as per reports, "Capital expenditure during the last three months of 2020 recorded an unprecedented YoY growth of 129% in October, 249% in November and 62% in December. The monthly GST collections also crossed the 1 lakh core mark consecutively for the last 3 months, reaching a new high."

Inflation and employment

Major driver of inflation in 2020 were high food prices. However, it came back in the RBI's favourable range of 4 -/+ 2% to reach 4.6% in December 2020 from 6.9% in November 2020. After consistently rising for 6 months since Q1 of FY21, headline inflation also came in range substantially by December. Core inflation stayed high on a yearly basis but eased eventually.

On top of the changing labour market drifts, the nation saw about 29 Central Labour laws being mixed and rearranged into 4 labour codes, accommodating the lowest pay permitted by law prerequisite and government assistance needs of the unorganized labourers inside the system of enactment.

"These are:

(i) Code on Wages (2019)
(ii) Industrial Relations Code (2020)
(iii) Occupational Safety, Health and Working Conditions Code (2020)

(iv) Code on Social Security (2020)"

Rural demand has been pushed up by the government's stress on rural infrastructure and economy and creation of durable assets through MGNREGS. Rural digitalisation and financial inclusion have also been stressed upon. Initiatives to promote skill development and entrepreneurship via packages like Aatmanirbhar Bharat Rojgar Yojana (for the self-employed and migrant workers) & Pradhan Mantri Rojgar Protsahan Yojana (with the target to encourage employers for formation of more work opportunities), have further empowered the economy to combat the COVID-19 impacts.

Social Infrastructure

"Provision for INR 4.31 lakh crore was made for the social sector including PMGKY, Anna Yojana, housing, and health (including R & D Grant for COVID-19 Suraksha), EPF support to worker & employers, street vendors, etc."

COVID-19 Emergency Response and Health Systems Preparedness Package of INR 15000 crore was announced and implemented with an aim to deliver a combination of emergency response and health system capacity-building efforts.

- Availability of necessary medicines, sanitizers, masks and PPE Kits were ensured by the government.

- "The 'PMGKP Insurance Scheme for Health Workers Fighting COVID-19' was announced on 30th March 2020 (provides an insurance cover of INR 50 lakh to healthcare providers, including community health workers)."

Under Education, PM e-VIDYA, "a comprehensive initiative to unify all efforts related to digital/on-air education to enable multi-mode and equitable access to education for students and teachers", was launched. This includes "One nation-one digital education infrastructure, one class-one TV channel through Swayam Prabha TV Channels, Swayam MOOCs for open schools, and pre-service education (1.5 crore students are enrolled under Swayam MOOCs)."

COMPARATIVE ANALYSIS

After understanding the Monetary and Fiscal measures adopted in India and their role in the economic recovery from the pandemic, we now move on to the comparative analysis between India and three other nations, namely, China, United Kingdom, and United States of America.

The following table contains the key measures (Fiscal and monetary) taken by the authorities and the overall performance of the GDP for all three countries.

Table 2

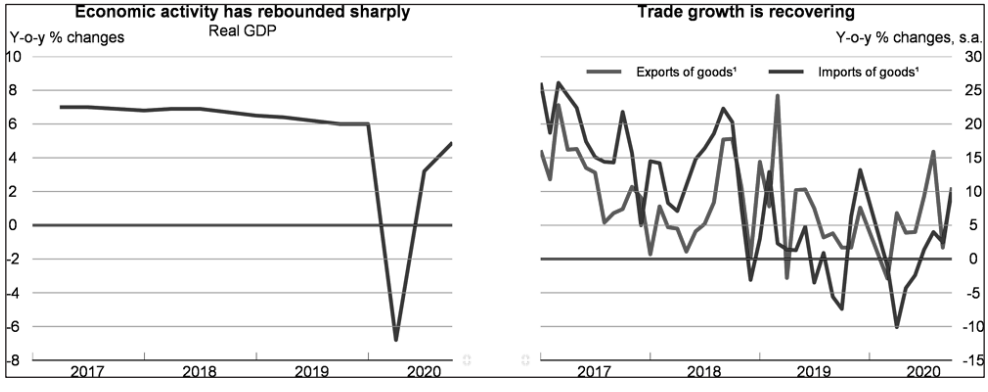
Basis	**China**	**United Kingdom**	**United States of America**
GDP performance in 2020	**Q1:** (-) 6.8% **Q2:** (-) 3.2% **Q3:** (+) 4.9% **Q4:** (+) 6.5% **Overall growth:**(+) 2.3%	**Q1:** (-) 2.5% **Q2:** (-) 19.8% **Q3:** (+) 15.5% **Q4:** (+) 1% **Overall growth:(-)**10%	**Q1:** (-) 5% **Q2:** (-) 31.4% **Q3:** (+) 33.4% **Q4:** (+) 4% **Overall growth:**(-) 3.5%
Fiscal Responses	An estimated $ 0.74 trillion (4.7% of GDP) of fiscal measures have been announced. **Key measures include:** **1.** Increased spending on prevention and control **2.** Production of medical equipment **3.** Disbursement of unemployment insurance **4.** Tax relief & waived social security contributions **5.** Additional public sector investments	**Tax and spending measures include:** **1.** Additional funding for NHS, public services, and charities ($ 66.86 billion) **2.** Measures to support businesses ($ 39.98 billion), **3.** Strengthening the social safety net to support vulnerable people ($ 11.03 billion) **4.** Various Bank loan schemes for the SMEs **5.** Provision to firms $ 1378.57 per furloughed employee retained **6.** Businesses required to shut down due to localized lockdowns will receive up to $ 2067.86 every three weeks	**Key measures include:** **1.** Direct stimulus payments of $600 to individuals **2.** Using $44 billion from the Disaster Relief Fund to provide extra unemployment benefits **3.** Continuing student loan payment relief and Deferring collections of employee social security payroll taxes **4.** US $ 2.3 trillion (11% of GDP) Coronavirus Aid, Relief and Economy Security Act ("CARES Act") **5.** US $ 8.3 billion Coronavirus Preparedness and Response Supplemental Appropriations Act for Virus testing, transfers to states
Monetary and Macro Responses	**Key measures include:** **1.** Liquidity injection via OpenMarket Operations **2.** Expansion of relending and re discounting facilities by $ 0.28 trillion to support manufacturers of medical supplies and daily necessities **3.** Reduction in the interest rates by 50 bps(re-lending) and 25 bps (re-discounting), **4.** Reduction of the 7-day and 14-day reverse repo rates by 30 bps **5.** Reduction of the interest on excess reserves from 72 to 35 bps **6.** Expansion of policy banks' credit line to private firms and MSEs ($ 54.19 billion)	**Key measures include:** **1.** Reducing Bank Rate by 65 bps to 0.1% **2.** Expanding the central bank's holding of UK government bonds and non-financial corporate bonds by $ 620.36 billion **3.** Introducing a new Term Funding Scheme to reinforce the transmission of the rate cut, with additional incentives for lending to the real economy, and especially SMEs **4.** Launching the joint HM Treasury-makes $ 454.93 bn of loans and guarantees available to businesses	**Key measures include:** **1.** Federal funds rate lowered by 150 bp to 0-0.25 bp **2.** Lowered cost of discount window lending, extended maturity of FX operations, temporary repo facility for international monetary authorities **3.** Primary Dealer Credit Facility to finance Fed's 24 primary dealers collateralized by a wide range of investment-grade securities **4.** Assistance to borrowers, providing mortgage forbearance for 12 months, and waiving related late fees

ANALYSIS

-China

China implemented strict measures to control the COVID-19 spread and it appears to be successful in most of the country. Investment has been a major growth driver in 2020. Consumption is still on a sluggish recovery path due to the lack of recovery in employment and falling household incomes. Fiscal policies continue to support growth for SMEs, Infrastructure, and other sectors, while monetary policy has become more neutral as recovery is gaining momentum.

Figure 6: China, Economic activity and trade (in nominal terms)

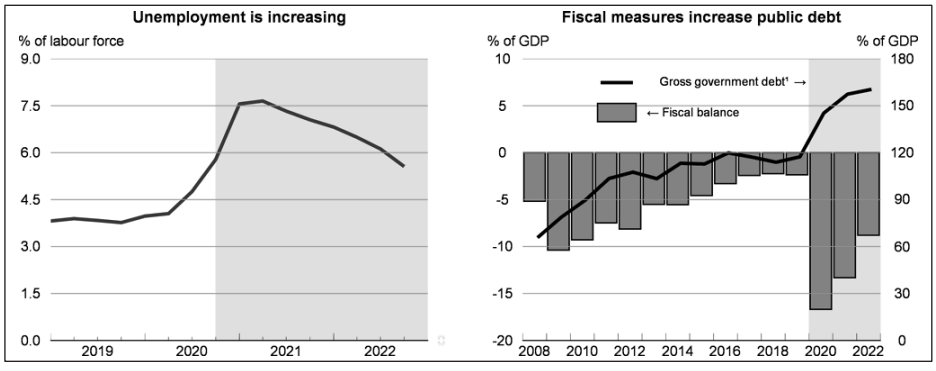


(Source: CEIC)

-United Kingdom

Daily confirmed cases of COVID-19 reached new records after the summer of 2020, as propagation increased and more people were tested compared with the first wave. In comparison to the April peaks, COVID-19-related cases and deaths are considerably lower, however pressure on the healthcare system has been on a rise. The government has extended and adjusted the economic support measures put in place early on in the crisis and introduced new measures. Monetary policy has played its accommodative role, easing financial stress and supporting demand in the economy.

Figure 7: United Kingdom, Unemployment and fiscal measures

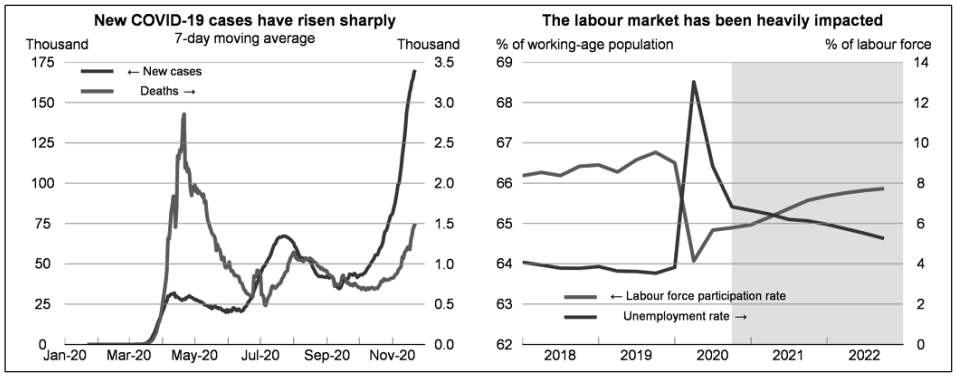


(Source: OECD Economic Outlook)

-United States of America

Monetary and Fiscal policies provided substantial support to the economy from the onset of the crisis. A broad and effective vaccine rollout will allow an ease in restrictions and strengthen confidence by the second half of 2021. Sectors Including the transportation and service sector continues to be impacted majorly by the pandemic. Financial assistance to state and local governments, to cushion the spending, due to fall in tax receipts should be maintained and support for unemployed people, now at risk of dropping out of the labour force, needs to be continued.

Figure 8: United States, COVID-19 and labour market



(Source: OECD Economic Outlook)

CONCLUSION

The Indian economy is slowly recovering from one of the world's tightest lockdowns and the deepest GDP contraction. While agriculture performed well from favourable weather conditions, the manufacturing and service sector are still gaining momentum. As per survey reports, COVID-19 disruptions led to shut down of 78% MSMEs, with earnings impacted by 20-50%, facing the maximum heat due to liquidity crunch. In terms of social indicators, rise in the unemployment rate from job losses, and rise in inequality in response to protracted school closures and reliance on online learning could be seen.

The rate of economic revival, as proxied by high-frequency mobility data and more traditional real economy indicators, has shown improvements. Some industries, including capital goods production have contracted, while others including four-wheelers are taking advantage of shifts in consumer preferences as they are deemed safer than public transport. Another bright side is that financial markets have been recovering since the March-April trough. Following a projected GDP contraction of 10% in FY'20 and the lingering scars to the economy, Economic Survey predicted a 'V-shaped' economic recovery, with GDP growth seen at 11% for FY'21 and it may take almost two years for GDP to get back to pre-pandemic levels. As per the IMF projections, India will enter an impressive growth rate of 11.5% in FY'21, the only country to enter a double-digit growth amidst this pandemic, whereas S&P projected a growth rebound to 10%.

Government policies should focus on sustainability and efficiency. Workers, particularly in the informal sector, should be protected through welfare instruments. Better targeting of tax expenditures and subsidies would lead to better utilisation of resources. Additionally, it is important to ease the mobility of labour, capital, technology and talent towards their most productive use. Furthermore, promotion of trade and foreign investment, by simplifying tariffs and liberalising trade in services, would increase competition on the Indian market and boost economic growth.

REFERENCES

- **Arjun Srinivas,** (18 November 2020) - *The Covid-19 boost to Health Insurance* (https://www.livemint.com/insurance/news/the-covid-19-boost-to-health-insurance-in-four-charts-11605597369780.html)

- **Arunika Agarwal, David E. Bloom, and Anita Shet** (July - December 2020)- *The Interplay among Demography, Health, and the COVID-19 Pandemic in India* (https://fpibengaluru.karnataka.gov.in/storage/pdf-files/Aarthika%20charche/Aarthika%20charche%20vol5%20no-2%20July_DEC%202020.pdf)

- **Bookings Institution** (25 January 2021) - *What's the Fed doing in response to the COVID-19 crisis? What more could it do?* (https://www.brookings.edu/research/fed-response-to-covid19/)

- **Centre for Strategic and International Studies** (28 October 2020) - *Comparing U.S., Japanese, and German Fiscal Responses to Covid-19* (https://www.csis.org/analysis/comparing-us-japanese-and-german-fiscal-responses-covid-19)

- **Committee on Economic and Monetary Affairs (ECON)** (November 2020) - *COVID-19 and Economic Policy Toward the New Normal: A Monetary-Fiscal Nexus after the Crisis?* (https://www.europarl.europa.eu/RegData/ etudes/IDAN/2020/658193/ IPOL_IDA(2020)658193_EN.pdf)

- **Ernst and Young India** (2 May 2020) - *Trade Policy scenario in the post COVID-19 era* (https://www.ey.com/en_in/tax/trade-policy-scenario-in-post-covid-19-era)

- **International Monetary Fund** (February 2021) - *Policy responses to COVID-19* (https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#U)

- **International Monetary Fund** (January 2021) - *Fiscal policy responses to COVID-19* (https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19)

- **KPMG India** (December 2020) - *Government and institutions measures in response to COVID-19* (https://home.kpmg/xx/en/home/insights/2020/04/india-government-and-institution-measures-in-response-to-covid.html)

- **Lekha Chakraborty and Emmanuel Thomas** (13 April 2020)- *COVID-19 and Macroeconomic Uncertainty: Fiscal and Monetary Policy Response* (https://www.nipfp.org.in/media/medialibrary/2020/04/WP_302_2020.pdf)

- **Maurice Kugler and Shakti Sinha** (July 13, 2020)- *The impact of COVID-19 and the policy response in India* (https://www.brookings.edu/blog/future-development/2020/07/13/the-impact-of-covid-19-and-the-policy-response-in-india/)

- **Ministry of Finance, GOI** (20 September 2020) - *Fiscal and monetary policies to deal with slowdown due to COVID-19* (https://pib.gov.in/PressReleasePage.aspx?PRID=1656925)

- **Ministry of Finance, GOI** (January 2021) - *Economic Survey Volume I and II* (https://www.indiabudget.gov.in/economicsurvey/)

- **Niranjan Rajadhyaksha** (21 October 2020) - *The paradox of India's stimulus response to the covid-19 crisis* (https://www.livemint.com/opinion/online-views/the-paradox-of-india-s-stimulus-response-to-the-covid-19-crisis-11603211389233.html)

- **N R Bhanumurthy and O.P.C. Muhammed Rafi** (July - December 2020)- *The Interplay among Demography, Health, and the COVID-19 Pandemic in India* (https://fpibengaluru.karnataka.gov.in/storage/pdf-files/Aarthika%20charche/Aarthika%20charche%20vol5%20no-2%20July_DEC%202020.pdf)

- **Organization for Economic Co-operation and Development** (1 December 2020) - *OECD Economic Outlook, Volume 2020 Issue 2* (https://www.oecd-ilibrary.org/sites/39a88ab1-en/1/3/3/9/index.html?itemId=/content/publication/39a88ab1-en&_csp_=fd64cf2a9a06f738f45c7aeb5a6f5024&itemIGO=oecd&itemContentType=issue)

- **Prashant Khadayate,** (19 May 2020) - *Understanding the looming financial distress for private hospitals in India* (https://www.expresshealthcare.in/ blogs/guest-blogs-healthcare/the-looming-financial-distress-for-private-hospitals-in-india/420588/)

- **Reserve Bank of India** (October 2020) - *Monetary Policy Report* (https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=19980#I1)

- **Raghuram Rajan, Money Control** (14 January 2021) - *Prioritise spending, boost infrastructure, sell PSUs: Raghuram Rajan on Budget* (https://www.moneycontrol.com/news/business/economy/prioritise-spending-boost-infrastructure-sell-psus-raghuram-rajan-on-budget-6348101.html)

- **Reserve Bank of India** (April 2020 - December 2020 and January 2021) - *Reserve Bank of India Bulletin* (https://www.rbi.org.in/scripts/BS_ViewBulletin.aspx)

Unfolding The GHI 2020

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ABSTRACT

In the recently published Global Hunger Index (GHI) 2020 report, India has been ranked at 94 among 107 countries and is in the 'serious' hunger category with a score of 27.2. The reason for recording hunger worldwide is to ensure that the world achieves "Zero Hunger by 2030" - a Sustainable Development Goal of the UN by raising awareness and understanding of the hunger problem, match levels of hunger among countries, and draw global attention to those areas of the world where hunger levels are alarming. This paper analyzes India's position highlighting various dimensions of the hunger index, thereby comparing it with other countries. It examines the reasons and suggests some ways to tackle the mounting problem of hunger in India.

OBJECTIVE OF STUDY

The study is undertaken to achieve following objectives:

1. To interpret the GHI and its determinants.
2. To analyze India's position and its comparison with other countries
3. To understand the reasons behind severe hunger issue in India
4. To find ways to reduce hunger problem and food insecurity in India.

RESEARCH METHODOLOGY

For the study, the paper-primarily uses content analysis tool incorporating the data from the Global Hunger Index 2020 report published by the Concern Worldwide and Welthungerhilfe, and international organizations such as UNICEF, WHO and various bodies of UN which work in this field. The data has been used to understand India's position vis-à-vis other countries and various parameters in eradicating hunger. Basic charts and growth rate figures are used to analyze India's stance. The paper attempts to explain the rationale behind India's position and suggest recommendations for a way out of the problem.

INTRODUCTION

The Global Hunger Index is a peer-reviewed annual report, mutually published by Concern Worldwide and Welthungerhilfe, designed to comprehensively quantify and track hunger at the global, regional, and country levels. The Global Hunger Index was first published in 2006. It is published every year since then, generally in the month of October. The 2020 edition marks the 15th edition of the GHI. The GHI score is calculated using a 3-step process that utilizes available data from various sources to capture the multidimensional nature of hunger.

First step, incorporates four component indicators from each country. These 4 components along with the method of calculating them is highlighted in Table1.

Table 1: Constituents of GHI

Three Dimensions	Four Indicators	How is it measured
Inadequate food supply	Undernourishment	% of population whose calorie intake is insufficient
Child undernourishment	Child wasting	% of children under 5 who have low weight for their height
	Child stunting	% of children under 5 who have low height for their age
Child mortality	Under five mortality rate	% of children dying before reaching the age of 5

Source: D wiesmann, H biesalski et al (2015)

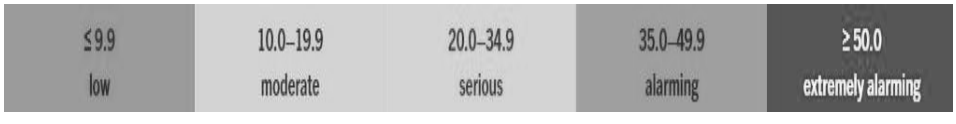
Second step, each of the four component indicators from a particular country are given a standardized score on a 100-point scale based on highest figure of that component from recent global trends.

Third step, a final score is calculated after giving a weightage of 33.33% each to undernourishment and child mortality and a weightage of 16.66% each to child wasting and child stunting. In other words, Undernourishment and child mortality

each contribute one-third of the GHI score, while the child undernutrition indicators—child wasting and child stunting—each contribute one-sixth of the score.

This three-step process results in GHI scores on a 100-point GHI Severity Scale, where 0 is the best score (no hunger), and 100 is the worst. In practice, neither of these extremes is reached. The GHI Severity Scale shows the severity of hunger— from low to extremely alarming—associated with the range of possible GHI scores. (Refer to Figure 2)

FIGURE 1: GHI SEVERITY SCALE



Worldwide hunger as an average is at a moderate level, according to the 2020 Global Hunger Report. In that, there are nearly 690 million undernourished people worldwide, 144 million children suffering from stunting, 47 million children suffering from wasting, and in 2018, 5.3 million children died before their fifth birthdays. Of the total 107 countries with sufficient data available, three suffer from alarming levels of hunger, 31 countries have serious levels of hunger (including India), 26 countries are there with a moderate level of hunger and 47 countries with a low level of hunger (including 17 countries with <5 level of hunger). It is critical to understand that the GHI scores presented in this report do not yet reflect the impact of COVID-19 on hunger and undernutrition. The data used is from 2016-2019, with the most current data in that component from each country. In 2020, because of the COVID-19 pandemic, the values of the GHI component indicators and GHI scores were likely to worsen.

Data used for calculating this score comes from various UN and other multilateral agencies like the Food and Agriculture Organization of the United Nations (FAO), United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME), Global database on child growth and malnutrition from WHO and surveys and statistical tables from UNICEF.

WHAT IS INDIA'S POSITION

In the 2020 Global Hunger Index, India ranks 94th out of the 107 countries with a score of 27.2 reflecting serious level of hunger.

FIGURE 2: INDIA'S GHI SCORE

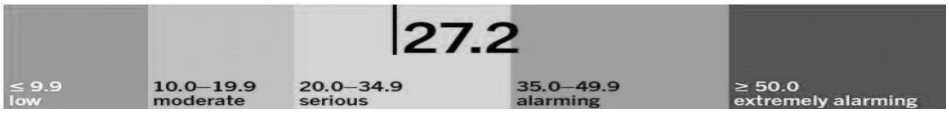
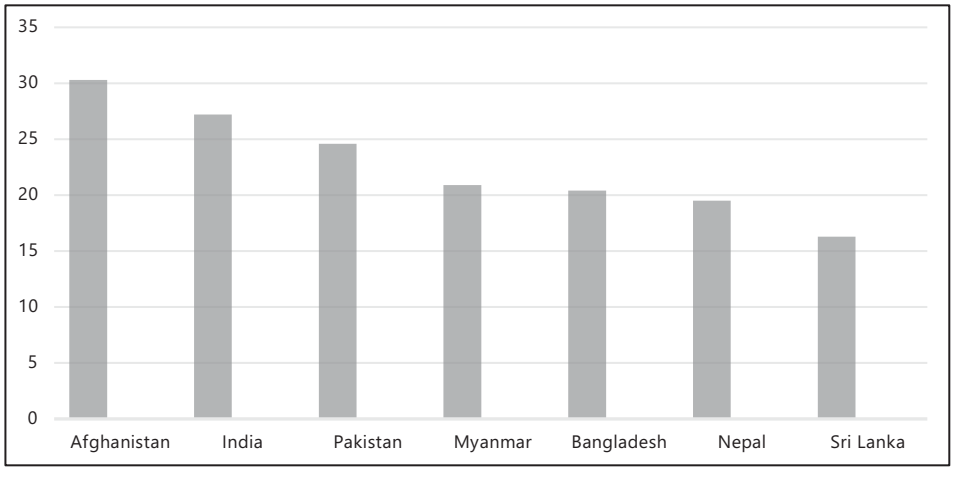


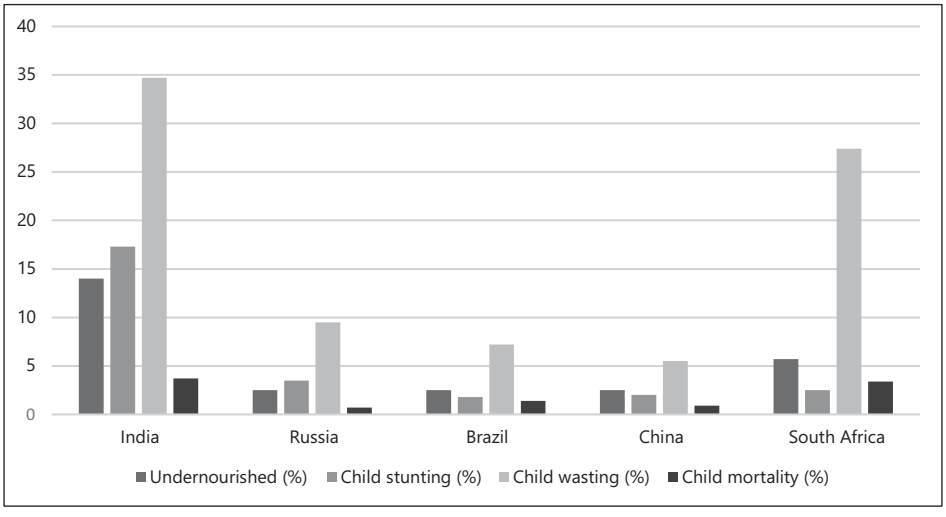
FIGURE 3: GHI SCORE IN SOUTH ASIA



Source: GHI, Concern Worldwide and Welthungerhilfe

The score of 27.2 is second to the worst among the South Asian countries. The score is inferior to Pakistan (24.6), Bangladesh (20.4), Sri Lanka (16.3), Nepal (19.5) and most other neighbours. Out of the total 107 countries, only 13 countries are worse than India including, countries like Rwanda, Nigeria, Afghanistan, Sudan and Liberia, among others.

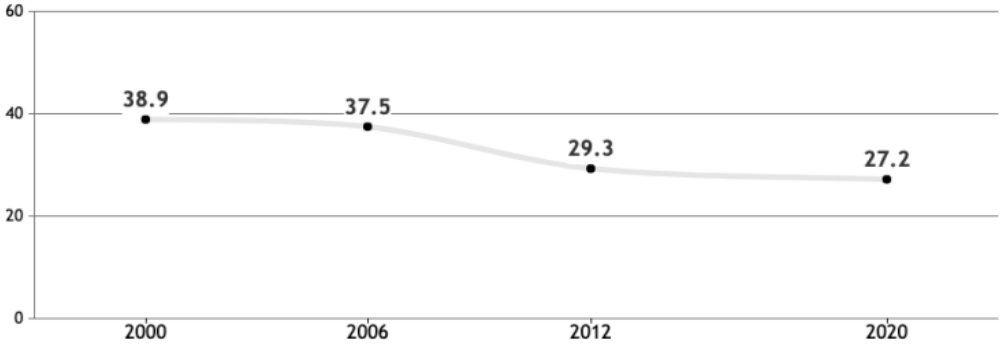
FIGURE 4: GHI SCORE IN BRICS NATIONS



Source: GHI, Concern Worldwide and Welthungerhilfe

India is way behind all the BRICS nations in all the parameters. India's score (27.2) is nowhere close to the global average of 18.2.

FIGURE 5: GHI SCORE TREND FOR INDIA



Source: https://www.globalhungerindex.org/india.html

Next, in the trend analysis of GHI for India, we see a decline in the overall GHI score with a diminishing percentage of the undernourished population, child wasting and under five mortality rate as highlighted in Figure 6 and Table 1. In terms of overall undernourishment, 14% of India's population does not get

enough calories. The child mortality rate has seen a significant decline from 9.2% in 2000 to 3.7% in 2020, the only parameter where we see an improvement. India's low score's biggest contributors are child stunting and child wasting. 17.3% of Indian children under five are wasted, which has seen no improvement from the previous score in the 2000s. When it comes to child stunting, we saw a sharp fall from 54.2% in 2000 to 34.7% in 2020, but the figure is still among the world's worst.

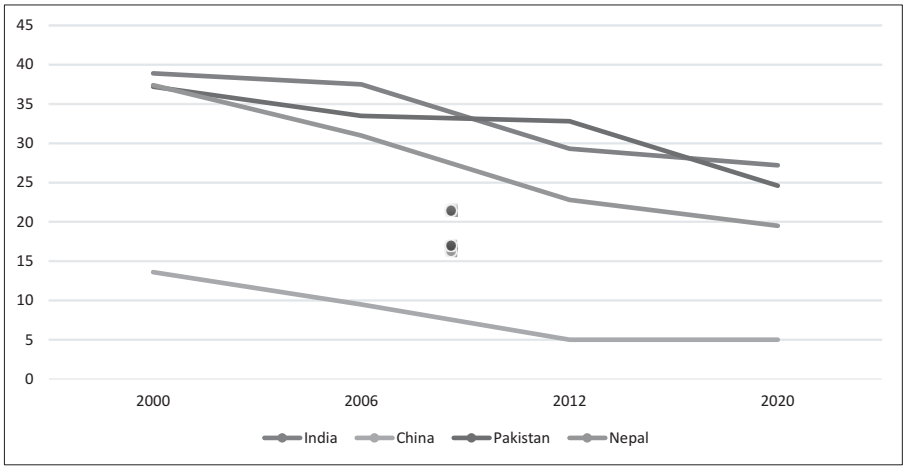
TABLE 2: INDICATOR WISE TREND FOR INDIA

GHI SCORE in the year	Proportion of undernourished In the population (%)	Prevalence of wasting in children under five years (%)	Prevalence of stunting in children under five years (%)	Under-five mortality rate (%)
2000	18.6	17.1	54.2	9.2
2006	19.8	20.0	47.8	7.1
2012	16.3	15.1	38.7	5.2
2020	14.0	17.3	34.7	3.7

Source: Appendix D, IFPRI- GHI

If we go by the official report, it is stated that it is futile to compare GHI date of one year with other for a country as the data on which the GHI scores are based are frequently being revised by the United Nations agencies that gather them, and each year's GHI report mirrors these changes. Comparing scores between different year's reports may create an incorrect impression on how GHI figures have improved or deteriorated, whereas in reality the change may partly or fully reflect a data revision. So comparing data vis-à-vis countries becomes more reliable where India has performed poorly as the rate of diminishing percentage of various parameters is more in most of the countries as compared to India.

FIGURE 5: GHI SCORE COUNTRY WISE TREND COMPARISON



Source: https://www.globalhungerindex.org/nepal.html
https://www.globalhungerindex.org/pakistan.html
https://www.globalhungerindex.org/china.html

In terms of percentage change of GHI scores since 2000, India has lagged behind countries like Pakistan and Nepal. For China, whereas we see a sharp decline from a score of 13.6 in 2000 to a score of less than 5 in 2012 and 2020 which suggests a percentage decline of massive 63% in GHI score. The percentage decline of Pakistan and Nepal is 33.9% and 47.9%, while for India the number hovers around 30%. Which suggests that in terms of improving our position we have not been able to match what our immediate neighbours have done. That is why although the score for the three countries was more or less same in 2000, the difference in curves have increased year by year.

REASONS FOR INDIA'S POOR SCORE

India, with a population of now close to 1.4 billion people, has seen significant growth in parameters like GDP growth and per capita consumption. Despite the fact that India produces sufficient food to feed its population, the food accessibility in many parts of the country is muddled. The most common opinion about problem of hunger, as many think, is food insecurity. But this belief is highly erroneous. At the time GHI 2020 report was published, India had a food stock of more than 70 million tonnes stored at various warehouses

of the Food Corporation of India, which is enough to ensure that no one went hungry, but we are often flabbergasted by the amount of food that rots in these godowns. We have The National Food Security Act, 2013 enacted to ensure food security for the most disadvantaged communities of the country. Under the act, 67% of the population (75% in rural areas and 50% in urban areas) are entitled to highly subsidized food grains. But the problem is more of accessibility than availability. The over-emphasis on food availability has hurt badly with less importance given to health, care and other determinants of malnutrition.

Child malnutrition starts very early in life. Reports of difference between Indian babies and African babies are astounding. As per a report, African babies are usually healthy at birth, but as they grow up, undernourishment starts to kick in. South Asian (Indian) babies, on the other hand, show very high levels of wasting very early in their lives within the first six months. This reflects the poor state of maternal health and less focus on childcare practices more than anything else. The societal aspect also comes into the picture. The inferior status of women in rural areas and their pre-legal age marriages leading to adolescent girls giving birth to babies who are bound to be malnutritioned. Low grade childcare practices involving no complete breastfeeding for the first five months, irregular complementary feeding afterwards and lack or low use of colostrum for the newborns take a toll on health of the children. According to a report by 'Child Rights and You' in August 2019, taking data from National Family Health Survey, 3 in every 5 children in India have been denied colostrum. Lack of unsafe drinking water sanitation especially in rural areas, make the situation miserable.

Next, what has the government been doing to tackle the issue? The Indian state implements massive social security programmes to support its disadvantaged population. For children, an integrated child development scheme (ICDS) is in place under which there are close to 1.3 million centers, called Anganwadi centers (AWC), that provide early education, health, nutrition services for children from birth up to six years of age. They also work for improving the hygiene and nutritional level of pregnant women and teach them basic healthcare measures for their child. Its reach in quantifying figures has been impressive, but these anganwadis suffer from a major predicament.
All this outreach and footfall looks good on paper, but the ground reality is

appalling. The prevalence of such high rates of child stunting and child wasting are the best answers for the failure of ICDS. These programmes are the hotbed of corruption, leakages, obstructions, poor allocations and little answerability. The infrastructure of ICDS centers is dreadful which makes their day to day working complex. "A survey conducted recently of 36 Anganwadi centers in the state of Odisha found that more than 85% of the AWCs did not have designated building for daily functioning and that the centers had a severe lack of water, toilet, and electricity facilities" (Source-wcdodisha.gov.in). In another report by the National Institute of Public Cooperation and Child Development, "27% of AWCs didn't have enough food supplies to feed all the students for more than 90 days". Ministry for women and child development always has troubles recruiting more members in AWCs, that's because the workers are not paid enough and are not trained enough to work efficiently. A Comptroller and auditor general (CAG) report highlighting the quality of food in anganwadis noted the distribution of sub-standard food by the AWCs. As per the report, in the 18 test-checked AWCs, children were reported to have fallen ill after consuming the preparation. As per a ruling by the Supreme Court of India, State Governments were instructed to conduct health camps in villages to ensure that every undernourished child and pregnant women are given adequate healthcare and nutritional diets to improve child wasting and stunting score. But the state administrations have failed to do so, the bureaucracy has been unresponsive in its work, and on-the-field workers are not motivated enough to work for the better. The administrative structure of ICDS is faulty, it is poorly delivered, and it needs immediate reforms.

WAY FORWARD FOR INDIA

A multifaceted approach is required to address the mounting problem of hunger. To end hunger by 2030, we need to reform our food systems and incorporate them into a wider political initiative to maximize health and ensure the right to healthy and nutritious food for all.

There is a growing need to design and build more efficient integrated food production, processing, preservation and distribution systems to feed the nation's evolving food requirements. There is a need to strengthen the PDS, focusing on women's health, which would lead to healthier pregnancies.

'Health camps' must be undertaken by the state government in every village to identify every malnourished child and pregnant woman. By undertaking these extensive health Camps, Government must ensure that those identified as malnourished receive proper nutrition and health care. Under the Integrated Child Development Scheme (ICDS) scheme, a more robust supplemental nutrition would also provide children with a better chance at all-round development. It is also essential to streamline access to food grains under the PDS by simplifying technological processes and reducing glitches associated with Aadhar.

COVID 19 has exposed the shortcomings of the PDS scheme's targeted design, and therefore, this is the best time to universalize PDS. Although the PDS may not eradicate malnutrition and child mortality, if its implementation is done effectively, it may help in reducing the hunger levels in India. The PDS has a vast potential to ensure good health for the people of India. Various measures are necessary so that it becomes the base for Nutritional security in India. Some measures include:

- Incorporating more items in the Public Distribution System's purview to provide nutritious food like pulses and edible oil.
- Providing fortified food grains to ensure nutritional security to masses.
- Investment in storage infrastructure is needed to reduce food wastage.

According to a report recently published in the journal Food Policy, three out of four rural Indians cannot afford a nutritious diet. It states that almost two out of three of them would not have enough money to afford the cheapest possible diet that meets the criteria set by the Government's premier nutrition body, even

though they spent their entire income on food. This highlights the importance of immediate, sustained intervention. There is a need to monitor food prices more closely through a nutritional lens and move India's current food policies away from their extreme bias towards cereals.

The government has tried to address the issue of food and nutrition insecurity by implementing reforms in Nutrition Assistance programs and

Social Protection schemes, since the early 2000s. These Programmes involved Mid-day Meals Schemes in Government and government aided schools (which was designed to improve the nutritional requirements of school aged children) and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which guarantees 100 days of employment every year to every rural household. Still, there remains widespread concern about India's food distribution system not having adequate access to affordable and nutritious food. Several organizations, which are working under the MGNREGA scheme, suggested that the guaranteed workdays be increased to 200 and that justifiable wages must be given following the states' minimum agricultural wages. The government has also initiated Pradhan Mantri Matru Vandana Yojana(PMMVY) to provide Rs.5000 Cash Transfers to pregnant women and lactating mothers on fulfillment of necessary conditions related to health and nutrition. Such social protection schemes and special programs have to be given a boost to increase employment and wages in rural areas. There is a need to improve the monitoring and accountability of all special programmes and schemes established to mitigate the exacerbating problem of hunger.

The Government must support small and marginal farmers in becoming sustainable and diversified producers. To ensure the affordability of a nutritious diet and tackle hunger, more crops have to be grown, especially by the small and marginal farmers, with the Government's support. Increasing food production in the nation does not necessarily ensure food security if the poor do not have the purchasing power. Therefore, to achieve food security, the participation of small farmers is necessary. A renewed focus is imperative on small and marginal farm holdings. Government must intervene more effectively to help vulnerable communities and victims of natural disasters and climate change. It may establish arrangements to supply vulnerable sections of society with cooked nutritious food. This must be done in addition to the current arrangements of nutritious diets from Anganwadi and schools through mid-day meals for children, mothers and students.

In a nutshell, a far more holistic approach to achieve nutritional security in India is required. Necessary action is needed in all parameters. Besides economic growth to lift more people out of poverty, the state must ensure the availability and accessibility of nutritious food to eliminate hunger and

malnutrition in deprived areas. For achieving nutritional security in India, agricultural programs and policies must focus on improving diet diversity. It should also focus on improving accessibility to micro- nutrient rich diets to improve health outcomes. There is a need for a reappraisal of social protection schemes that improve monitoring and greater accountability. The administrative design and structure of ICDS need immediate improvement and on the ground implementation of social policies must be made more accountable, without which the goal of zero hunger is highly improbable.

CONCLUSION

In the Global Hunger Index 2020, India ranked 94th out of 107 countries. This report is quite troubling because even being one of the largest producers of food in the world, India still reflects a severe level of hunger and food insecurity. With a population of over 1.3 billion to feed, it is imperative to address the issue of food wastage to combat hunger and to improve food security. Even though significant efforts are made to enhance production, there is not much emphasis placed on curbing food supply chain losses. Despite focusing on improving food production only, there is also a need to ensure accessibility and affordability of nutritious food to improve health outcomes.

In the Overall analysis, poor implementation of policies, flawed administrative designs, lack of adequate monitoring, lack of transparency and accountability, poor governance and lack of political efforts contribute to the mounting problem of hunger and food insecurity in India. They are the constraints in reducing hunger levels, and therefore, Action is needed on all fronts. Economic growth can lift people out of extreme poverty, but it alone is insufficient to reduce malnutrition among children. Focus on improving agricultural policies and proper implementation of social protection schemes and a reappraisal of such schemes to strengthen monitoring, and greater accountability is needed. Concerted policy action is needed to attain the goal of rapid reduction in hunger and improve the indicators of hunger.

REFERENCES

- https://www.globalhungerindex.org/download/all.html
- https://www.globalhungerindex.org/india.html
- https://www.indiafoodbanking.org
- Doris Wiesmann, Hans K Biesalski, Klaus von Grebmer, Jill Bernstein: Methodological Review and Revision of the Global Hunger Index
- https://qzcom.cdn.ampproject.org/v/s/qz.com/india/1584703/indias-icds- anganwadi-system-is-a-challenged-but-impressive-effort/amp
- https://www.globalhungerindex.org/case-studies/2016-india.html
- UN IGME (UN Inter-agency Group for Child Mortality Estimation). 2019a. Levels and Trends in Child Mortality: Report 2019. https://childmortality.org/reports.
- https://www.downtoearth.org.in/blog/food/global-hunger-index-why-is-india- trailing--73920
- Saxena, N.C. (2013),Governance challenges to reducing hunger and malnutrition in India
- https://niti.gov.in/writereaddata/files/document_publication/Indias%20perfor mance%20in%20Global%20Hunger%20Index.pdf
- https://www.globalhungerindex.org/ranking.html
- https://www.livemint.com/news/india/how-hunger-came-back-to-haunt- india-11608654584660.html
- http://rchiips.org/nfhs/factsheet_NFHS-5.shtml
- https://in.one.un.org/wp-content/uploads/2016/09/ZHC_23Jan2014-HighRes- Pages.pdf

An Analysis of Macroeconomic and Bank-Specific Causes for Burgeoning NPAs in India and Related Management Practices

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ABSTRACT

This paper seeks to identify and analyse various causes behind the prominence of Non-Performing Assets (NPAs) in Indian commercial banks by using time series data from 2001 to 2019. We undertake Multiple Linear Regression (MLR) analysis to determine the impact of certain macroeconomic factors on NPAs. We also study the impact of bank-specific factors like ownership and internal management. We then identify various recovery mechanisms introduced till date and explore their efficacy in addressing the issue. Finally, we discuss how technological upgradation, managerial reforms, asset reconstruction mechanisms and revamp of the debt-laden agriculture sector can serve as the way ahead.

Keywords: Bad Banks, Macroeconomic Causes, Multiple Linear Regression, Non-Performing Assets, Recovery Mechanisms

INTRODUCTION

Banks play a pivotal role in maintaining the financial health of any nation, especially in a developing country like India. They act as channels between savers and investors, thereby facilitating investment in the economy and subsequently, enabling economic growth. Robust banking systems portray the soundness of a financial system. According to Rajeev and Mahesh (2010), "a healthy financial system can help achieve efficient allocation of resources across time and space by reducing inefficiencies arising out of market frictions and other socio-economic factors." The sustainability of the banking sector determines the financial stability of any economy.

In this regard, one of the most important factors determining the health of the banking sector and to a large extent, the financial health of an economy, is the level of Non-Performing Assets. In India, the banks, particularly the Public Sector Banks have been at the helm of day-to-day macroeconomic management rather than primarily intermediating the saver's money into productive investments, the process being called "Banking-Sector Fiscalisation" (Patel, 2020). This Stackelberg leadership model[1] followed by India, where the sovereign has a major control over the financial intermediaries, itself poses an aggravated moral hazard and builds enormous pressure on the banks, particularly the public sector in India (Bhattacharya & Patel, 2005).

NPAs have major implications, not just on the performance of the financial sector, but on the functioning of the entire economy. Ballooning NPAs can lead to a loss of essential funds that could've been used, otherwise, to enhance economic outcomes. This might further lead to an increased unemployment across various sectors. It is also considered to be an important cause of the increase in current account deficit. Further, it might negatively impact serious and genuine borrowers, due to a general reduction in the confidence of banks. There are various other mechanisms through which NPAs affect the economy, and the impact is usually considered to be negative.

[1] The Stackelberg leadership model is a strategic game in economics in which the leader firm moves first and then the follower firms move sequentially. In this instance, credit creation in India has been majorly state-sponsored.

The quality of assets was not a major concern for Indian banks till 1991. The banking sector mostly cared about performance objectives and macroeconomic issues including expansion, priority sector lending, employment generation and financing development of rural areas (Singh, 2016). But, after the 1991 reforms in India, the economy paced up and with it came some of the associated problems. NPAs are natural for any economy but only to a certain extent. However, this is a grave problem in India, given that the NPAs have been increasing significantly.

The problem of NPAs severed due to impact of Global Financial Crisis (GFC) of 2008 on the global economy in general, as well as on the Indian economy. The bursting of the subprime loan bubble seems to have deeply impacted the financial sector of our country. Even as many argue that it didn't affect India to the extent it did to the other countries like the US and the European nations, the effects got deep rooted into the system in reality and it was one of the major reasons for the 'NPA Evergreening' in India (Paul, 2018). Although the then central government played an important role in managing the crisis, a perilous system started developing in the background. The public banks were asked to lend heavily for output growth for the very reason that Public Sector Banks (PSBs) generally act as government's intermediaries for GDP growth (Patel, 2020). Due to the boom in the economy in the mid-2000s, extensive lending was undertaken. However, investment in such highly leveraged projects is seen as more prone to turbulence (Vishwanathan, 2016) and the owner's equity started declining by considerable amounts. 'Irrational Exuberance' correctly defines the situation prevailing then. Credit growth averaged 20% YoY till 2011. A few years down the line, the situation reversed and the NPAs started piling up rapidly.

NPA: Definition and Categorisation

In accordance with the definition provided by the Reserve Bank of India (RBI), an asset for a bank becomes non-performing when it ceases to generate income in the form of interest and/ or instalment of principal for a period of more than 90 days. The RBI classifies NPAs in three categories depending on the period for which the asset has remained non-performing and the realisability of the dues. The classification is as depicted in the following table.

Table 1: Categorisation of NPAs

Asset Classification	Criteria
Sub-standard Assets	An asset that has remained NPA for a period less than or equal to 12 months.
Doubtful Assets	An asset that has remained in the substandard category for 12 months.
Loss Assets	An asset that is considered "uncollectible" or has such a small value that it's continuance as an asset is not suggested, although there may be some recovery value left.

Source: Reserve Bank of India

The provisioning norms for NPAs set by the RBI differ according to their categorisation. For substandard assets, banks have to create a general provision of 10 percent on total outstanding. For doubtful assets, the requirement is 20 percent to 100 percent of the secured portion depending upon the age of doubtful asset and 100 percent on the unsecured portion. Loss assets may be either written off or fully provided by the bank. The entire asset should be written off.

Moreover, according to Tandon and Tandon (2019), Gross NPA is an advance which is taken to be irrecoverable and for which the bank has made provisions, and which is still reflected in banks' books. Net NPA is calculated by deducting Gross NPA with certain items, as follows;

Net NPA = Gross NPA- (Balance in interest suspense account + claims received + part payment received + total provisions held)

DETERMINANTS OF BURGEONING NPAS IN INDIAN BANKS

Macroeconomic Factors

There exists some literature pertaining to identification of macroeconomic factors. According to Sudarsan and Kathari (2019) there are four major macroeconomic variables, namely economic growth, unemployment rate, interest rate and inflation. Nkusu (2011) suggests that there exists a negative relationship between economic growth and NPAs, as during booms, both consumers and firms face sufficient income streams and revenues to make

payments on principal as well as interest on outstanding borrowings. However, as the economy booms, credit is extended, in a lending spree, to the debtors of lower creditworthiness as well, which in turn leads to an amplified default rate when a recession sets in later cycles.

Further, Louzis et al. (2012) suggests that an increase in unemployment rate affects NPAs positively. An increase in unemployment rate negatively impacts the income streams of households and therefore adds to their burden of debt. In context of firms, an increase in unemployment may signal reduced production as an outcome of fall in effective demand. This situation may lead to reduced revenues for the firms and thereby, negatively affect their repayment ability as well.

Another important macroeconomic variable to be considered is interest rates. Drawing insights from Bahruddin and Masih (2018), an increase in interest rates raises the amount to be repaid in the form of interest, thereby adding to the debt burden of the borrowers. Economically, interest rates seem to have a positive relation with NPAs.

Inflation rate also seems to have some kind of relationship with NPAs. Numerous studies have undertaken analysis to identify this relationship. Ghosh (2015) hypothesizes that this relation is ambiguous. Keeping the nominal interest rate constant, inflation should reduce the real value of debt, thereby making repayment easier and lowering NPAs. Another reason for such a negative relationship can be that inflation rate is associated with a lower unemployment with respect to the traditional Philip's Curve, and as mentioned previously, unemployment seems to be positively related to NPAs. However, when nominal wages are sticky, it can also reduce the real income of the borrowers, thereby adding on to their debt burden. Also, in case of variable interest rates, the creditors can vary the interest rates to maintain their real return, thereby shifting the entire burden on borrowers.

Along with these variables, many other macroeconomic variables also influence the quantum of NPAs, but the above mentioned variables are easily observable and seem to maximally impact NPAs theoretically. Hence, we analyse the statistical relationship between the four identified variables and gross and net NPAs.

Multiple Linear Regression (henceforth, MLR) analysis is undertaken to identify this relationship. Required secondary data is taken from various sources, including Reserve Bank of India website and World Bank website. Data from 2001 to 2019 is considered for the analysis.

Figure 1: Line Chart for Macroeconomic Variables and NPA Ratios

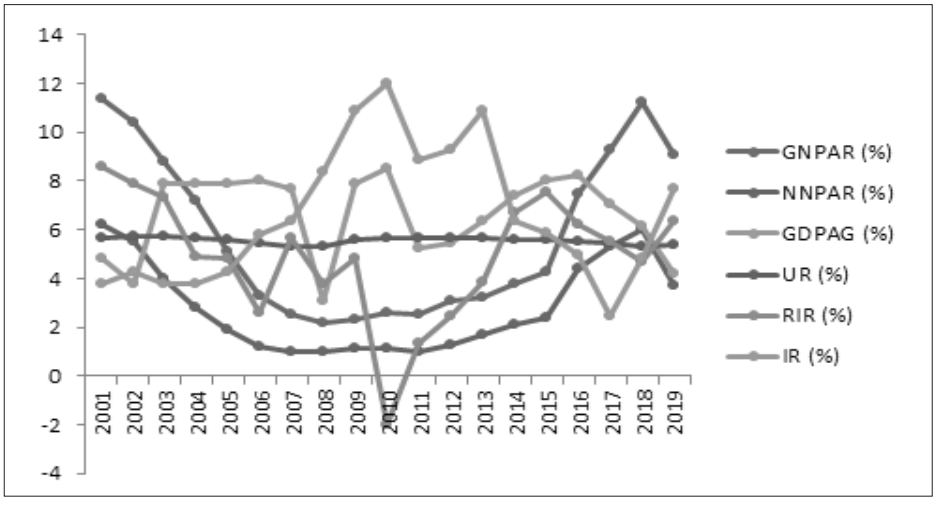


Table 2: Descriptive Statistics

Variable	Mean	SD	Kurtosis	Skewness	Range	Minimum	Maximum
GNPAR (%)	5.7789474	3.3576743	-1.4441103	0.4886819	9.2	2.2	11.4
NNPAR (%)	2.8263158	1.8725627	-1.0840861	0.6779225	5.2	1	6.2
GDPAG (%)	6.61	1.6947173	-0.6840195	-0.8033929	5.41	3.09	8.5
UR (%)	5.5473684	0.1441389	-0.9665504	-0.6493612	0.45	5.28	5.73
RIR (%)	4.9031579	2.5560235	1.6006987	-1.0403434	10.57	-1.98	8.59
IR (%)	6.5552632	2.7994828	-0.7951774	0.5655519	9.5	2.49	11.99

Considering the above-recognised macroeconomic variables, the regression equation can be written as follows-

$Y = b0 + b1X1 + b2X2 + b3X3 + b4X4 + e$

In the above model;

Y = Gross NPA to Gross Advances Ratio or Net NPA to Net Advances Ratio (GNPAR or NNPAR)

X1 = GDP Annual Growth Rate (GDPAG)
X2 = Unemployment Rate (UR)
X3 = Real Interest Rate (RIR)
X4 = Inflation Rate based on Consumer Prices (IR)
MLR analysis is undertaken for the concerned variables for the duration ranging from 2001 to 2019. The following tables summarise the outcomes of the analysis. Firstly, Gross NPA Ratio is taken to be the dependent variable.

Table 3: Model Summary (Dependent Variable- GNPAR)

Multiple R	*R Square*	*Adjusted R Square*	*Standard Error*	*Significance F*	Durbin-Watson
0.782061899	0.611620814	0.500655332	2.372677835	0.007039409	1.09689871

Table 4: Regression Coefficients

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*VIF*
Intercept	-0.779295637	21.6057233	-0.036068945	0.971736632	-47.11896335	45.56037208	
GDPAG (%)	-0.570687447	0.350289526	-1.629187871	0.125559311	-1.321983759	0.180608865	1.12679206
UR (%)	2.655953357	3.985298772	0.666437702	0.515964192	-5.891662397	11.20356911	1.055064851
RIR (%)	0.153919041	0.307282559	0.500903928	0.624221661	-0.505136501	0.812974582	1.972424847
IR (%)	-0.786811145	0.277879848	-2.831479691	0.013327822	-1.382804143	-0.190818147	1.934927415

As seen in Table 3, the p value of the model is 0.007, which is less than 0.05. This depicts that the model is significant and a good fit for the data. Also, the Durbin-Watson (DW)[2] statistic is calculated to be 1.095. The DW statistic is acceptable; hence the model is considerably free from the problem of autocorrelation. Additionally, the VIF[3] for each macroeconomic variable is acceptable; therefore, the model is considered to be free from the problem of multicollinearity as well.

Holding the level of significance of 5%, we find that GDP annual growth rate, unemployment rate and real interest rate are statistically insignificant, while inflation rate is statistically significant in determining gross NPA ratio.

The following regression equation is obtained by plugging in statistically determined coefficients-

[2] Durbin Watson (DW) statistic is a test for autocorrelation in the residuals from a statistical regression analysis. As a rule of thumb, values between 1 and 3 are acceptable.

[3] Variance Inflation Factor (VIF) measures the multicollinearity in a set of regression variables. As a rule of thumb, values less than 10 are considered to be free from multicollinearity.

Y = - 0.7792956 - 0.5706874 X1+ 2.65595336 X2 + 0.15391904 X3 - 0.7868111 X4 + e

The results from above, as well as the correlation matrix for NPA ratios and macroeconomic variables (see Appendix B) reveal that there exists a negative relation between gross NPA, and GDP growth and inflation, while there exists a positive relation between gross NPA, and unemployment and interest rate.

Similar analysis was undertaken keeping Net NPA Ratio as the dependent variable. Following tables provide the outcomes of the analysis

Table 5: Model Summary (Dependent variable- NNPAR)

Multiple R	*R Square*	*Adjusted R Square*	*Standard Error*	*Significance F*	*Durbin-Watson*
0.759761324	0.577237269	0.456447917	1.380565323	0.012166463	1.095466527

Table 6: Regression Coefficients

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*VIF*
Intercept	0.059979196	12.57149703	0.004771046	0.996260589	-26.90320028	27.02315867	
GDPAG (%)	-0.285578225	0.203819316	-1.401134258	0.182950081	-0.72272718	0.151570729	1.12679206
UR (%)	1.183370012	2.31888426	0.510318705	0.617779086	-3.790142079	6.156882104	1.055064851
RIR (%)	0.133872221	0.1787953	0.748745754	0.466404633	-0.249605557	0.51735	1.972424847
IR (%)	-0.391590292	0.161687051	-2.42190262	0.029599528	-0.738374526	-0.044806058	1.934927415

The outcomes of the analysis remain the same as before, and the regression equation is as follows-

Y = 0.059979 - 0.28558 X1 + 1.18337 X2 + 0.133872 X3 - 0.39159 X4 + e

The above equation as well as the correlation matrix, depicts similar relationships as previously derived in relation to gross NPAs. Hence, we see that macroeconomic variables (significantly or insignificantly) impact the quantum of NPAs in the country. Thus, similar to the findings of Nkusu (2011), a favourable macroeconomic environment with rising GDP, falling unemployment, smaller interest rates and rising prices control NPAs and vice versa.

Additionally, the exchange rate is another important macroeconomic variable that impacts the persistence of NPAs. Bardhan and Mukherjee (2016) find that the Nominal Effective Exchange Rate (NEER) has a significant positive impact on NPAs. Appreciation of domestic currency leads to an increase in the amount of NPAs. Appreciation of currency makes indigenously

produced goods relatively costlier, thereby reducing the international competitiveness of indigenous producers. This tends to reduce their earnings, thereby reducing their ability to repay loans.

Bank-Specific Factors

The factors determining NPAs aren't solely exogenously determined macroeconomic variables, but also bank specific variables (Louzis et al, 2012). Policy choices of banks and their own characteristics also hugely impact the amount of NPAs. According to Bardhan and Mukherjee (2016) bank specific factors play a very significant role in the evolution of NPAs, since they also determine the financial health of a bank. The performance of banks, bank specific loan recovery mechanisms, policies with respect to lending, bank size, risk assessment and exposure etc, play a very important role in the concerned aspect. Berger and DeYoung (1997) examine the causality between NPAs, cost efficiency of banks and bank capital. They provide certain hypotheses, few of which are stated below-

a) *Bad management hypothesis*: Low cost efficiency is an indicator of poor management performance. Inefficient managers don't monitor and control their operating expenses. They may also fail to judge the creditworthiness of their borrowers and may choose inefficient investment projects. Consequently, a huge number of assets may turn out to be non performing.

b) *Skimpking hypothesis*: Banks may, in the short run, economise on their costs allocated for monitoring and underwriting loans. This may make them appear cost efficient, but in the long run, the quantum of NPAs would rise due to lower attention devoted to initial monitoring, thereby adding on to the amount of NPAs.

c) *Moral hazard hypothesis*: Thin capitalisation of certain banks provides their managers the moral hazard incentives to raise the riskiness of their loan portfolio.

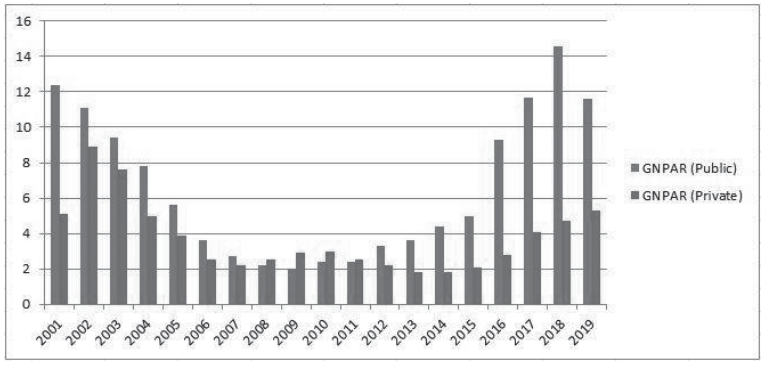
Berger and DeYoung (1997) provide empirical evidence in support of the above hypotheses. Thus, the above mentioned reasons might lead the managers to lend to inefficient borrowers, thereby financing bad projects with little or no

creditworthiness. Moreover, bank size is also important in this aspect. Salas and Saurina (2002) and Rajan and Dhal (2003) find a negative relation between bank size and NPAs, while Louzis et al. (2012) argues that larger sized banks tend to have higher NPAs, because larger banks engage in riskier activities rather than going for diversification. Additionally, a bank's past performance, measured in terms of its profitability also impacts the level of NPAs. There seems to be an inverse relationship between profitability and NPAs, whereby greater profitability in the past may increase the bank's capacity to absorb bad loans in the future. However, greater profitability in the past may lead the bank towards exuberant lending, thereby raising the probabilities of possible defaults. Hence, there seems to be an ambiguous relationship between profitability of the banks and their NPAs (Bardhan & Mukherjee, 2016).

Ownership-Based Determinants

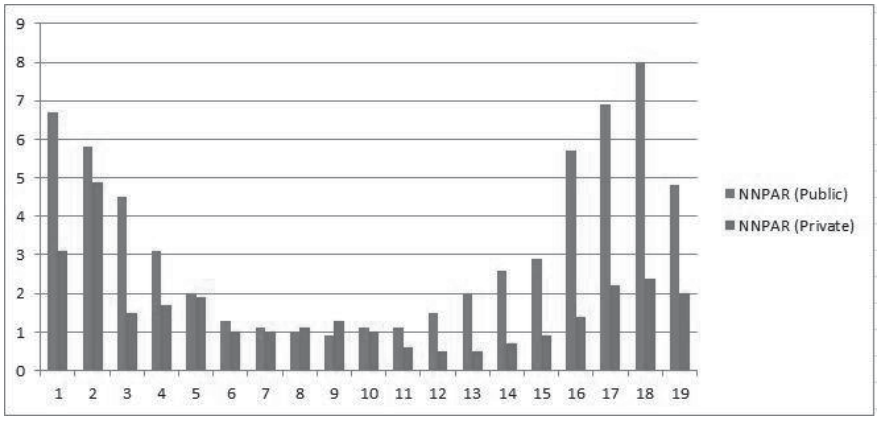
Ownership of banks (in our case, indigenous banks) plays an important role in determining the banks' ability to deal with the problem of NPAs. We have undertaken a statistical analysis in order to determine whether there exists a difference in the proportionate level of NPAs between public and private sector banks. The current study uses a 2 sample T-test (assuming unequal variances) to identify if such a difference exists. The data that we use pertains to the time period ranging from 2001 to 2019 and the concerned variables are GNPA ratio and NNPA ratio respectively[4].

Figure 2: Gross NPA Ratio in Public and Private Sector Banks



[4] Unlike numerous previous researches, we have taken NPA ratios instead of absolute values of NPAs, since we believe that proportionate NPAs with regards to advances provide a better picture than the latter.

Figure 3: Gross NPA Ratio in Public and Private Sector Banks



Undertaking the above mentioned test (see Appendix C), we find at a level of significance of 5%, we conclude that the mean of the GNPA ratio in public sector banks is larger than the mean of the GNPA ratio in private sector banks. Similar analysis for net NPA ratio provides the same outcome i.e. the mean of the NNPA ratio in public sector banks is larger than the mean of the NNPA ratio in private sector banks.

This evidence leads us to believe that the proportionate NPAs with respect to lending are higher in public sector banks than private sector banks. According to Brahmaiah (2019), proportionate NPAs in PSBs are higher than their private counterparts because PSBs usually adopt more liberal credit policies, and have their loans concentrated towards specific sectors. The study also suggests that PSBs are inefficient in managerial aspects. This may be due to the lack of ownership incentives for the managers. Moreover, PSBs are subject to milder regulatory environments in comparison to their private counterparts and the role of RBI is largely limited in this aspect.

In addition to the above mentioned factors, NPAs seem to be largely determined by the differential lending during varied phases of business cycles. During the initial expansionary stage (just after an economic downturn), firms' profits and repaying capacity tend to increase in comparison to the downturn. Thus, NPAs may reduce during this period. But, during the boom phase (when the economy is just to go into another downturn) banks may lend exuberantly, over estimating the performance of

various investment projects. This may aggravate the NPA situation. Moreover, unanticipated shocks to the economy may also lead to an increase in the NPAs.

APPROACHES TO NPA MANAGEMENT IN INDIA: PAST AND PRESENT INITIATIVES

Lok Adalats

'Lok Adalats' in literal sense mean the court of the people. Set up under the Legal Services Authorities Act, 1987, it is a mechanism where disputes or cases pending in the court of law or at a pre-litigation stage are settled mutually. The decision given is binding on all parties and there is a very meagre scope of further repeal. If there is no decision, the parties can proceed with the normal court hearings. The Lok Adalats are given autonomy to decide on matters having a value of upto Rs 10 Lakhs. More than 8.25 crore cases have been settled by this system. In a study by Rajbahadur (2016) it was found that the efficiency of debt recovery and NPA management by Lok Adalats was poor during 2008-09 and it mostly declined further (see Figure 4).

Debt Recovery Tribunals

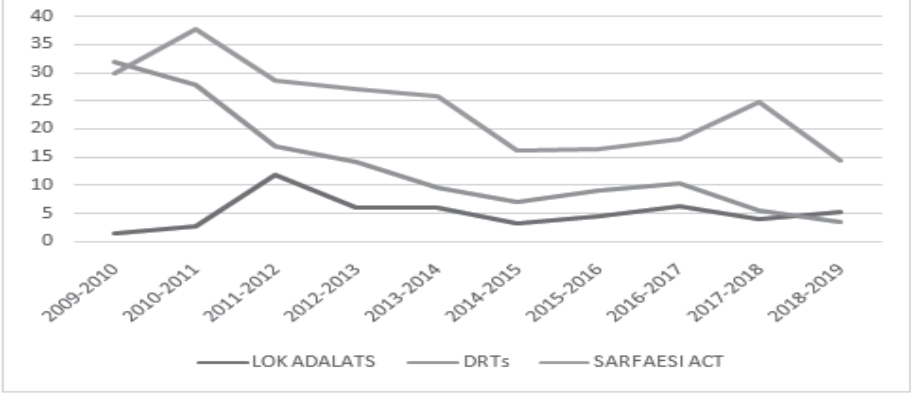
DRTs were set up with the objective of expeditious adjudication of the matters related to recovery of debts by financial institutions. The DRT is also the appellate body on matters related to SARFAESI Act. Securitisation Appeals (SAs) can be filed with the DRTs by those aggrieved against action taken by secured creditors under the SARFAESI Act.The Act also had a fate similar fate as of most bills in India, of slow process and red-tapism (Dey, 2018). The Vivad Se Vishwas Bill, 2020 will now cover pending litigations in Debt Recovery Tribunals (DRTs) as well besides those in various courts and tribunals, as announced by the Union cabinet.

SARFAESI Act

The SARFAESI (Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest) Act is considered as one of the landmark reforms in providing the creditors the rights to liquidate the borrower's assets, mainly the collateral. Before the act, it was a very cumbersome and

unrewarding process to go after the assets of the borrowers and realize them in the markets to ease the liquidity woes of the lender (Dey, 2018). In 2002, the Andhyarujina Committee prepared a report on the basis of which this act was passed. The provisions of the act enabled banks and financial institutions to go after the speedy recovery of their dues from defaulters, with help of private ARCs (Assets Reconstruction Companies) to reduce their NPAs (Bhadury & Pratap, 2018). This act allowed ARCs to take direct possession of the defaulters' assets or do a strategic management overhaul without the elongated litigation processes and it ensured the borrowers could no longer enjoy the undue safeguards from the BIFR/SICA (Rajeev & Mahesh; 2010).

Figure 4 : Comparative Analysis of Recovery Mechanisms



Source: Off-site returns, RBI and IBBI (2010-2019)
(Figures are in as-a-percentage recovery.)

Infrastructure Refinancing Scheme (2014)

The scheme tried to elongate the amortization period of assets of the borrower companies so as to reduce their provisioning cost and smoothen the cash flows, thereby improving their credit profile. The scheme broadly covered the eight core sectors which would comprise the majority of the stressed loans. Ultimately, the scheme couldn't serve the purpose well as it led to hefty interest burden for the borrower companies and led to evergreening of loans (Bhadury & Pratap, 2018).

Strategic Debt Restructuring (2015)

RBI launched the scheme in June 2015 to give an opportunity to creditor banks to convert the borrower company's debt (given that their loan was restructured[5], yet it could not finally meet the conditions of restructuring) to 51% equity and sell them to the highest bidder, subject to authorization by existing shareholders. Again, the expectations couldn't be met due to confusions over debt revaluation and long procedure (Mervin, 2018).

Indradhanush Scheme and PSB Recapitalization

The Indian Government announced the Indradhanush plan for revamping Public Sector Banks in August, 2015. The plan envisaged infusion of capital of about Rs. 70,000 crore in PSBs by the Government over a period of four financial years (PIB, n.d.).

In October 2017, the government announced massive recapitalization of PSBs for Rs 2.11 Trillion, of which the majority would be raised through sale of recapitalization bonds. It was ensured that the PSBs had sufficient liquidity and didn't curtail credit creation.

Insolvency and Bankruptcy Code (IBC)

IBC Act, 2016 was a landmark progress in the management of NPAs in India. The law aims to consolidate all the existing frameworks by creating a unified law for insolvency and bankruptcy. The law is well-phased, structured and involves multiple and stakeholder bodies. India then ranked 136 out of 189 countries in the World Bank's index of ease of resolving insolvencies. The law proved to be relatively efficient and many amendments have been made to it till date, thereby making NPA management more efficient.

Recommendations of the RBI's Internal Working Group of November 2020

The Internal Working Group suggested that the Banking Regulation Act, 1949

[5] Restructuring of loans means that when a moneylender alters the terms of credit in order to help the borrower when it's facing financial distress. This is generally done to avoid the loan being classified as a NPA and the borrower further being considered as a defaulter.

should be amended to prevent various malpractices, including the unethical unaccounted relationship between businessmen and banks, and to improve supervisory mechanisms, especially for the larger conglomerates. The RBI has been actively reforming monitoring and supervision of borrowers, especially due to certain cases of misgovernance of credit in the past (Arun, 2020).

THE WAY AHEAD: SUGGESTIONS FOR AN IMPROVED NPA SITUATION IN INDIA

Management Efficiency and Personnel Incentivisation

As mentioned earlier, the monetary authority, as well as the banks, is keen on enhancing management efficiency and providing banking personnel the incentives to undertake responsible banking. It is commonly understood, the banks, public or private, should be managed by a professional Board of Directors (BoD). Additionally, a proper succession plan should be laid beforehand, in order to avoid gaps in management sustainability. With regards to PSBs, there must be minimum political interference and these banks should be allowed to take independent decisions and be held accountable for them.

The bankers should critically scrutinise accounts and credibility of their borrowers. In this regard, third party credit information agencies like Credit Information Bureau (India) Limited or CIBIL. Bank personnel needs to be incentivised to undertake efforts to identify and lend to only genuine borrowers. A comprehensive performance based compensation mechanism can be one way to incentivise bankers against taking unwarranted risks, thereby enhancing banks' corporate governance. Deferred bonus payments, typically after three to five years of performance analysis and pensions and other retirement benefits promised to be paid solely on the basis of performance, can be helpful in this direction (Keppo & Xuchuan, 2017).

According to Koudijs, Salisbury and Sran (2018) bankers with less personal liability pose a greater likelihood of engaging in 'too risky' lending practices. Hence, it is extremely necessary that Bankers should be made more liable and answerable for their actions.

Efficient Utilisation of Technology and Scope for Innovation

Technology can be of tremendous importance in addressing the problems of rising NPAs. It can be effectively used to improve credit monitoring and fast track recovery mechanisms. According to a study conducted by Dinesh et al. (2020), majority of the bankers strongly believe that "adoption of obsolete technology" is the most important reason behind the defaults on loans. Technology indeed enhances the lenders' ability to access borrowers' credibility and has added to the overall transparency of the lending process. As stated by Nirmal and Derashri (2018), many banks still don't use technology optimally, and focus on paper work rather than digital processes. Hence, there is an urgent need to shift towards greater technology utilisation to deal with NPAs.

Robotic Process Automation (RPA) and advanced data analytics could be of immense importance in identifying legitimate and prospective borrowers and would facilitate banks to invest in more productive projects with longer term prospects (The Economic Times, 2017). In this direction, an important topic being discussed extensively now-a-days is the possibility of the inclusion of blockchain in banking. The 'shared infrastructure' of blockchain would ensure the validity of the information, thereby facilitating banks to access risks and detect frauds on a real-time basis. This technology is thought of as a "game changer" in credit monitoring (Vaidhyanathan, 2021).

Similar innovations towards a stronger database automation and enhancement of borrower evaluation and credit monitoring would lead to a reduction in the quantum of NPAs, thereby improving the overall financial health of the Indian banks.

Bad Banks and Good Banking

Bad banks are one of the most talked about mechanisms of NPA redressal even today. The need for the bad banks in India was recently brought up by the RBI chief Shaktikanta Das, after the Stress Test done[6] by the apex bank

[6] A bank stress test is an analysis conducted under hypothetical scenarios designed to determine whether a bank has enough capital to withstand a negative economic shock such as a deep recession or a financial market crash.

showed a worrisome data about a new probable wave of bad debts. This is not something new. Our country has witnessed similar situations in credit creation post economic recessions to boost growth and development. Many of the Economic Surveys in the past have indirectly talked about setting these up. For instance the Economic Survey 2016-17 argued for setting up a "Public Sector Asset Rehabilitation Agency".

Technically, bad banks are a type of Asset Reconstruction Companies (ARCs) which take over the bad loans of Lender Institutions for a discount and then try to realise those assets themselves. The initial corpus is provided by the government and in the due course the banks and other entities co-invest in it. The major objective and benefit of these kinds of institutions is that they clean up the Balance Sheet of the lender bodies and do not let the credit creation process take a hit which is so mandatory for a middle-income country like India (Verma, 2021). The Banks can sell their doubtful or bad assets to them and they are freed from the associated burden of maintaining excessive provisioning for the bad loans, which in turn increases the amount of their loanable funds and will prevent banks from accumulating losses (Shridharan, 2020). Moreover, the implicit benefits of specialisation in work & division of labour are expected to be in favor of this idea.

Historically as well, ARCs have been a success story in NPA management. The role of Korea Asset Management Company (KAMCO) in reviving S. Korea during the East Asian crisis of 1997 was exemplary (Bhadury & Pratap, 2018). One may inquire why they have not been implemented till now if they are theoretically sound. There are some major apprehensions regarding this idea. Many experts assert that this is just a way of transferring things from one pocket to another; the major question of inefficient lending and recovery or more formally put as structural deficiencies is being ignored by this setup. The questions also arise on the probable decline in incentives available to the banks to closely monitor their debt since they can get rid of this via the bad banks. Also, the transfer pricing will be a matter of concern, for which the Swiss Challenge Method of Price Discovery[7] is likely to be adopted (Roy, 2021). Hence, numerous complications need to be dealt with, before their establishment.

[7] This means that even as an asset is transferred to the new asset reconstruction company (ARC) at a pre-agreed price, bids will be called later from others, and the highest bidder will get the asset.

Solving the Agrarian Crisis: Alternate Non Traditional Ways for the Future

The agricultural sector in India, despite being the largest sectoral employer, is extremely plagued in terms of investment and productivity (Gaur, 2008) and has alarming levels of NPA. Many factors can explain this condition - be it dependence on monsoons, high rates and prevalence of informal lending, proneness to natural and regional disasters, etc. (Kriti et. al., 2018). Anticipation of loan waivers may further disincentive repayments. The schemes are generally announced for the typical marginal farmers in India, but the benefits seldom reach to them. The banks get the repayments from the government after some time period, which forces them to keep provisions for long and thus the profitability declines.

A revamp of the agricultural sector is the need of the hour. Although a few steps have been taken, much more can be done seeing the pressing population dependence in India. The formalization of agricultural credit provision must be a priority for the governments. SHGs and mechanisms like ROSCAs[8] can also be promoted at the grassroots level. The success story of Rajasthan Grameen Aajeevika Vikas Parishad (RGAVP) in the rural Rajasthan is exemplary. The recent turmoil over the MSPs and Mandis could be overcome by linking the Futures Markets and the farmers, wherein the farmers would be able to come out of the never-ending Cobweb model[9] crisis; they will be able to supply and produce according to the expected trends of the future (Chatterjee et al., 2019).

CONCLUSION

This study discusses the direction and significance of the impact of various macroeconomic variables, including economic growth, unemployment rate, real interest rate and inflation rate. The analysis shows that both Gross and

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[8] A Rotating Savings and Credit Association (ROSCA) is a group of individuals who agree to meet for a defined period in order to save and borrow together, a form of combined peer-to-peer banking and peer-to-peer lending.

[9] This refers to a phenomenon where the prices of certain goods witness fluctuations that are cyclical in nature. It happens due to faulty producer expectations, generally due to adaptive expectations.

Net NPA ratios, as expected, are negatively related with GDP growth rate and inflation rate, whereas they are positively related with unemployment rate and real interest rate. However, all factors except inflation rate seem to have a statistically insignificant impact. Moreover, there seems to be a greater presence of proportionate NPAs in public sector banks than their private counterparts. Additionally, numerous bank specific factors, including managerial efficiency, profitability, bank size etc, also impact the quantum of NPAs to a great extent.

The Indian government has been dealing with the NPA problem by continuous improvisation of recovery mechanisms; the recent measures being the banks recapitalization (to not let further credit growth deteriorate, which is crucial for a developing country like India) and the IBC 2016 to make the recovery faster and efficient. However, numerous other measures can be undertaken, as elaborated previously, to improve the management of NPAs further. By use of AI and ML in the banking sector, creation of entities like Bad Banks and solving the stress in the priority lending sectors; particularly agriculture, where in alternative forms of lending and market integration can go a long way in solving the crisis facing the country

REFERENCES

- Arun, M. (2020, November 24). RBI working group recommendations: NBFCs to turn banks? *India Today*. Retrieved from https://www.indiatoday.in/india-today-insight/story/rbi-working-group-recommendations-nbfcs-to-turn-banks-1743754-2020-11-24

- Bahruddin, W.A., & Masih, M. (2018). Is the relation between lending interest rate and non-performing loans symmetric or asymmetric ? evidence from ARDL and NARDL. *MPRA Paper* 91565, University Library of Munich.

- Banner. (n.d.). Retrieved from https://drt.gov.in/

- Bardhan, S., & Mukherjee, V. (2016). Bank-specific determinants of nonperforming assets of Indian banks. *International Economics and Economic Policy, 13*(3), 483-498.

- Berger, A. N., & Deyoung, R. (1996). Problem Loans and Cost Efficiency in Commercial Banks. *SSRN Electronic Journal*. doi:10.2139/ssrn.2277

- Bhadury, S., & Pratap, B. (2018). India's Bad Loan Conundrum: Recurrent Concern for Banking System Stability and the Way Forward. *Banking and Finance Issues in Emerging Markets International Symposia in Economic Theory and Econometrics,* 123-161.

- Bhattacharya, S., & Patel, U.R. (2005) Reform Strategies in the Indian Financial Sector. In: Tseng W., Cowen D. (eds) India's and China's Recent Experience with Reform and Growth. Procyclicality of Financial Systems in Asia. Palgrave Macmillan, London.

- Brahmaiah, B. (2019). Why Non -Performing Assets Are More in Public Sector Banks in India? *Theoretical Economics Letters, 09*(01), 75-82. doi:10.4236/tel.2019.91007

- Chatterjee, T., Raghunathan, R., Gulati A. (2019). Linking farmers to futures market in India. *ICRIER, W.P. 383*.

- Dey, S. (2018). Recovery Mechanisms of Non-Performing Assets in Indian Commercial Banks: An Empirical Study. *NSOU-Open Journal*.

- Dinesh, S., Ananthi, M., Surulivel, S.T., & Rengarajan, R. (2020). Diffusion of Digital Technologies towards NPA Management. *International Journal of Advanced Science and Technology*, 29(5), 4137 - 4142.

- Gaur, U. (2008). Loan Waiver Scheme and Indian Agriculture. *W.P. 195, Centre For Civil Society.*

- Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability, 20*, 93-104.

- Kelkar, V. L., & Shah, A. (2019). *In service of the republic: The art and science of economic policy*. Gurgaon, Haryana, India: Allen/Lane, an imprint of Penguin Random House.

- Keppo J., & Xuchuan Y. (2017, July 23). How to change bankers' bonuses to curb excessive risk-taking. *The Straits Times*. Retrieved from https://www.straitstimes.com/business/invest/how-to-change-bankers-bonuses-to-curb-excessive-risk-taking

- Koudijs, P., Salisbury L., & Sran, G. (2018) . Bankers' liability and risk taking. (n.d.). *VOX, CEPR Policy Portal*. Retrieved from https://voxeu.org/article/bankers-liability-and-risk-taking

- Kriti, Patwari, M., Koshy, R.G. (2018). NPAs in the Agrarian and Industrial sector: A study on Scheduled Commercial Banks. *Journal of Management Research and Analysis (JMRA)*.

- Lok Adalat. (2019, February 26). Retrieved from https://nalsa.gov.in/lok-adalat

- Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2010). Macroeconomic and Bank-Specific Determinants of Non-Performing Loans in Greece: A Comparative Study of Mortgage,

- Business and Consumer Loan Portfolios. *SSRN Electronic Journal*. doi:10.2139/ssrn.1703026

- Merwin, R. (2018, December 28). Banks on a long and winding road to debt recovery. Retrieved from https://www.thehindubusinessline.com/money-and-banking/banks-on-a-long-and-winding-road-to-debt-recovery/article25853826.ece

- Ministry of Finance, Government of India (2017). Economic Survey 2016-17. *OUP Catalogue, Oxford University Press*, edition 2.

- Nirmal, A., & Derashri, P. (2018). Banks NPAs and use of Artificial Intelligence to Manage. https://www.researchgate.net/publication/330514066

- Nkusu, M. (2011). Nonperforming Loans and Macrofinancial Vulnerabilities in Advanced Economies. *IMF Working Papers, 11*(161), 1. doi:10.5089/9781455297740.001

- Non-Performing Assets and The Recovery Mechanisms. (n.d.). Retrieved from http://www.legalserviceindia.com/legal/article-3771-non-performing-assets-and-the-recovery-mechanisms.html

- Patel, U.R. (2020). *Overdraft: Saving the Indian Saver* (1st ed.). Harper India.

- Paul, A. (n.d.). Examining the rise of Non-Performing Assets in India. *PRS India*. Retrieved from https://www.prsindia.org/theprsblog/15904

- Rajan R., & Dhal S.C. (2003). Non-Performing Loans and Terms of Credit of Public Sector Banks in India: An Empirical Assessment. *Reserve Bank India Occasional Paper 24*.

- Rajeev, M., & Mahesh, H.P. (2010). Banking Sector Reforms and NPA: A Study of Indian Commercial Banks. Working Papers 252, Institute for Social and Economic Change, Bangalore.

- Recapitalisation of Public Sector Banks. (n.d.). Retrieved from https://pib.gov.in/PressReleasePage.aspx?PRID=1515650

- Remya Nair, G. G. (2018, September 15). Irrational exuberance before 2008 responsible for NPAs. Retrieved from https://www.livemint.com/Industry/WwVdpwnVfKz5clxzHYzcZJ/Irrational-exuberance-before-2008-responsible-for-NPAs.html

- *Reserve Bank of India* (n.d.). Retrieved from https://www.rbi.org.in/scripts/BS_ViewMasCirculardetails.aspx?id=5090

- Roy, A. (2021, February 25). Bad bank may follow Swiss challenge method for price discovery of assets. Retrieved from https://www.business-standard.com/article/finance/bad-bank-may-follow-swiss-challenge-method-for-price-discovery-of-assets-121022500062_1.html

- Salas, V., & Saurina, J. (2002). Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks. *Journal of Financial Services Research* 22, 203–224.

- Shridharan, S. (2020, December 24). Why Bad Bank is a bad idea for India-

Business News. *Business Today*. Retrieved from https://www.businesstoday.in/opinion/columns/why-bad-bank-concept-cant-work-in-india-banking-sector-npas/story/425833.html

- Singh, V.R. (2016). A Study of Non-Performing Assets of Commercial Banks and it's Recovery in India. *Annual Research Journal of SCMS*, Pune.

- Sudarsan K., & Kathari S. (2019). Nexus Between Non-Performing Assets And Macroeconomic Variables: A Study Of Indian Banking Sector. *International Journal of Scientific & Technology Research*.

- Tandon, D., & Tandon, N. (2019). Ballooning Non-Performing Assets in Indian Banking and Insolvency and Bankruptcy Code. *International Journal of Political Activism and Engagement, 6*(1), 1-24.

- *The Economic Times* (2017, December 12). Process automation and analytics could bring down NPA woes. Retrieved from https://economictimes.indiatimes.com/industry/banking/finance/banking/process-automation-and-analytics-could-bring-down-npa-woes/articleshow/62045028.cms?from=mdr

- Vaidhyanathan, J. (2021, January 27). Banking on technology: 5 tech trends every bank should be prepared for in 2021. *Business Today*. Retrieved from https://www.businesstoday.in/opinion/columns/five-technology-trends-to-shape-indian-banking-and-financial-services-in-2021/story/429280.html

- Verma, S. (2021, January 22). Explained: The arguments for and against a bad bank. *The Indian Express*. Retrieved from https://indianexpress.com/article/explained/npa-bad-bank-balance-sheet-loan-rbi-shaktikanta-das-7151841/

- Vishwanathan, N.S. (2016). Issues in Infrastructure Financing In India, 6th National Summit, ASSOCHAM.

- World Bank Open Data. Retrieved from https://data.worldbank.org

Appendix

A. Data on Macroeconomic Variables and NPAs of SCBs

Year	GNPAR (%)	NNPAR (%)	GDPAG (%)	UR (%)	RIR (%)	IR (%)
2001	11.4	6.2	4.82	5.66	8.59	3.78
2002	10.4	5.5	3.80	5.72	7.91	4.30
2003	8.8	4	7.86	5.73	7.31	3.81
2004	7.2	2.8	7.92	5.67	4.91	3.77
2005	5.1	1.9	7.92	5.60	4.86	4.25
2006	3.3	1.2	8.06	5.45	2.57	5.80
2007	2.5	1	7.66	5.32	5.68	6.37
2008	2.2	1	3.09	5.28	3.77	8.35
2009	2.3	1.1	7.86	5.57	4.81	10.88
2010	2.6	1.1	8.50	5.64	-1.98	11.99
2011	2.5	1	5.24	5.64	1.32	8.86
2012	3.1	1.3	5.46	5.65	2.47	9.31
2013	3.2	1.7	6.39	5.67	3.87	10.91
2014	3.8	2.1	7.41	5.61	6.70	6.35
2015	4.3	2.4	8.00	5.57	7.56	5.87
2016	7.5	4.4	8.26	5.51	6.23	4.94
2017	9.3	5.3	7.04	5.42	5.52	2.49
2018	11.2	6	6.12	5.33	4.69	4.86
2019	9.1	3.7	4.18	5.36	6.37	7.66

Source: Reserve Bank of India and World Bank Open Data

The above data pertains to Gross NPA to Gross Advances Ratio (%), Net NPA to Net Advances Ratio (%) and macroeconomic variables namely, GDP Annual Growth Rate (%), Unemployment Rate (%), Real Interest Rate (%) and Inflation rate (consumers' prices) (%).

B. Correlation Matrix for NPAs in Scheduled Commercial Banks and Macroeconomic Factors

	GNPAR (%)	*NNPAR (%)*	*GDPAG (%)*	*UR (%)*	*RIR (%)*	*IR (%)*
GNPAR (%)	1					
NNPAR (%)	0.97266446	1				
GDPAG (%)	-0.2437478	-0.2326059	1			
UR (%)	0.03741581	0.02476467	0.17985217	1		
RIR (%)	0.60230114	0.61556783	-0.1504734	0.02924751	1	
IR (%)	-0.7112298	-0.6873232	-0.0631397	0.04301969	-0.6683646	1

C. Data on Public and Private NPAs

Year	GNPAR (Public)	GNPAR (Private)	NNPAR (Public)	NNPAR (Private)
2001	12.4	5.1	6.7	3.1
2002	11.1	8.9	5.8	4.9
2003	9.4	7.6	4.5	1.5
2004	7.8	5	3.1	1.7
2005	5.6	3.9	2	1.9
2006	3.6	2.5	1.3	1
2007	2.7	2.2	1.1	1
2008	2.2	2.5	1	1.1
2009	2	2.9	0.9	1.3
2010	2.4	3	1.1	1
2011	2.4	2.5	1.1	0.6
2012	3.3	2.2	1.5	0.5
2013	3.6	1.8	2	0.5
2014	4.4	1.8	2.6	0.7
2015	5	2.1	2.9	0.9
2016	9.3	2.8	5.7	1.4
2017	11.7	4.1	6.9	2.2
2018	14.6	4.7	8	2.4
2019	11.6	5.3	4.8	2

Source: Reserve Bank of India

D. Hypothesis Testing for GNPA and NNPA Ratios in Public and Private Banks

Following are the respective hypotheses for comparing GNPA ratio (Public) and GNPA ratio (Private):

H0: μ GNPAR(Public) = μ GNPAR (Private)
H1: μ GNPAR(Public) > μ GNPAR (Private)

Keeping the level of significance at 5%
P value (one-tailed) = 0.006 < 0.05 = α (LoS)
Hence, the null hypothesis is rejected in favour of the alternative.

Similarly for NNPAR,
P value (one-tailed) = 0.003 < 0.05 = α (LoS)
This leads to the similar conclusion as above.

The Political Leaning Paradox: Are Growth and Development Similarly Affected?

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ABSTRACT

Economic development of nations has always been considered a socially determined concept, yet it is commonly measured in material terms. Socio-political scenarios are, however, the cardinal identity of a country and may be possible determinants of not just economic growth but also citizens' individual social and emotional development. For the purpose of this paper, the authors will focus majorly on three types of political leanings i.e., left-wing, right-wing, and center-left. This paper attempts to establish the relationship, if any, that exists between where governments identify on the political spectrum and the economic growth that occurs during their governance. Further, we will try to investigate the existence of a similar correlation between political leanings and human development. The idea of development being measured only by economic growth has long become redundant and how citizens feel, living in a particular country is also an important aspect of its success.

Thus, how political leanings affect all aspects of development is the fundamental question that our research seeks to answer. Throughout this paper, we try to establish our argument using two countries that stand widely apart on the political spectrum currently- India and the United States of America. The authors will attempt to integrate these two countries into a model where we research a possible relationship between their economic and social development and the political leanings of governments and end it on a general note where we can establish a conclusion applicable in a wider sense.

Keywords: Economic Growth, Development, Political Leaning, Political Spectrum, Relationship

INTRODUCTION

Economic development of nations has always been considered a socially determined concept, yet it is commonly measured in material terms. Socio-political scenarios are, however, a cardinal identity of a country and may be possible determinants of not just economic growth but also citizens' individual social and emotional development. The political spectrum is huge and different nations with changing governments identify with different parts of it. Political leanings of a particular government at a point of time most definitely influences distribution of resources, growth of resources and general tranquillity that further affects productivity. For the purpose of this paper, the authors will focus majorly on three types of political leanings i.e., left-wing, right-wing and center-left. Left wing ideology, historically, supports equality throughout, irrespective of social divisions and works towards reducing any excessive economic and social differences between people that may already exist. The Right-wing ideology is its polar opposite in the sense that it perceives these differences to be the existing norm of society and the obvious effects of competitive economies. Center-left ideology is moderate in its approach but leans more to the left of the spectrum in the sense that it is slowly supportive of right -wing ideas of socialism but also doesn't renounce capitalism completely. This paper attempts to establish the relationship, if any, that exists between where governments identify on the political spectrum and the economic growth that occurs during their governance. Further, we will try to investigate the existence of a similar correlation between political leanings and human development. The idea of

development being measured only by economic growth has long become redundant and how citizens feel, living in a particular country is also an important aspect of its success. Thus, how political leanings affect all aspects of development is the fundamental question that our research seeks to answer. Now, political orientations of a government or a political party are sometimes stated in party manifestos or become vaguely obvious eventually through policies executed in the period of a particular governance. Throughout this paper, we try to establish our argument using two countries that stand widely apart on the political spectrum currently. The United States of America has recently elected a Democratic president after a term with the Republicans in between. Since these two have been the only competing fronts for control of the Congress, they stand in an almost contrast. The Democrats are commonly described as left-wing in the media and their proposed policies, pre-Covid and during the pandemic as well, were centred around providing ample support packages, building state houses, supporting small businesses and creating more jobs for everybody. Our second country in question, India, has had two successive terms with Narendra Modi, a member of the Bharatiya Janta Party. BJP has historically been one with an ideology centered around conservatist and nationalist principles. Their social ideals are closely connected to the Rashtriya Swayamsevak Sangh (RSS) and their economic preferences had been close to socialism earlier but have steadily shifted to encouraging free markets in the past few decades. So, they can be logically placed as right. In contrast, the Indian National Congress, though far from right, could never identify completely as left either. With some vestiges of capitalism seen throughout their terms, they can be referred to as, centre-left. Throughout this paper, the authors will attempt to integrate these two countries into a model where we research a possible relationship between their economic and social development and the political leanings of governments and end it on a general note where we can establish a conclusion applicable in a wider sense.

LITERATURE REVIEW

Political preferences of governments and political stability in countries affects the market process to a great extent. The root of political leanings also lies in their economic impacts and ideals. So, political factors have historically always been considered important for analysing economic performance of

countries and this has featured as an important research question in multiple pieces of literature. It is argued that a particular government's political ideology might influence people's temporary expectations from the market but can't bring about a substantial change in the economic growth trend of a country.[1] However, usually, the election of a particular leaning government can be very reflective of how individual voters think and conduct or would like to conduct business. This can have long lasting and wide-ranging impacts on a national economy.[2] Here, it is also important to note though, that the previously mentioned argument is based on an inherent assumption that every citizen is well informed and has economic ideas in sync with their political affiliation. Studies show that that is not always the case. Often, citizens have contradictory ideals of policy making and welfare initiatives from the State.[3] However, even when parts of the electorate are unsure of what they desire from the State economically versus politically; the State, if with a clear idea of economic ideals and political affiliations, can and historically, has brought about major changes in the economic as well as social trends. The left-wing ideology strongly believes that the working class represents a bigger portion of the economy as consumers than the actual owners of capital i.e., capitalists. So, a fair distribution of income and pursuing policies like minimum wage will encourage a major proportion of consumers to spend more, kickstarting the growth process, which will ultimately benefit everyone, including the capitalists. Socially, people under governments pursuing left-wing or more liberal policies are found to be happier and rate their rate of welfare higher in comparison to people governed by conservative policies.[4] Economically, however, left-wing economics has faced a lot of opposition. Critics argue that practices like artificially inflating the wages for workers, might actually lead entrepreneurs to start laying off workers in place of increasing machines, keeping the overall income of the lower class almost similar to before. Also, profit is usually the single driving force for most capitalists and any negative impact on them might make them lose all incentive to even enter the marketplace. Ultimately, the economy will suffer a regressive downturn in productivity. The right-ideology for decades

[1] Alesina(1987)

[2] North (1998)

[3] Achterberg(2011)

[4] Kozaryn,Holmes,Avery (2014)

has centered around pursuing policies like privatisation and lesser taxations for the rich. The working class always has a lesser voice for power in a right-wing government than the rich does. Due to the larger proportion of the working economies in most big economies however, a majority of the population remains socially unhappy, as seen in most studies. Letting the free markets rein, has led to bigger disparities in wealth than ever before and sustainability has taken a big time hit. When the capitalist system had just been freshly presented to the world though, it made enormous practical sense. It was the paragon of development and growth, that the left could not compete with. Its hard-hitting impacts in the past decades however, have started to dawn upon many supporters worldwide.[5]

RESEARCH METHODOLOGY

For the purpose of our research, we took into consideration two countries- India and United States of America. Both with their current governments, identify wide apart on the political spectrum. In addition, they also stand in direct contrast with respect to being developing and developed. These two countries were chosen due to the clear demarcation of left-wing and right-wing governments that they have experienced over the past years. Not only are they two of the world's largest democracies, they have had terms majorly oscillating between two fronts, unlike most other countries around the world. This could possibly show a much better impact, that change of political leanings of governments results in.

To make sure efficient representation takes place, data taken represents a period of 30 years from 1990-2019. Throughout this time, the governments have substantially changed and with different leanings.

Now, to represent growth that remains constant throughout countries, the GNI Per Capita Income PPP (Current International $) for India and USA was collected from the World Bank's database of world development indicators. Then, to analyse development, it's best measure i.e, the Human Development Index was collected for the same period, of the two countries from the United Nations' Development Programme's database. We plotted these figures in different scatter plots to investigate a possible relationship between

[5] Beckett(2019)

economic growth and political leanings of governments, development and political leanings of governments. Since the plotting of the data required us to quantify political leanings, we used a popular 'political compass' approach. Under this method, the political ideology of governments can be placed anywhere on a -1 to 1 axis, representative of the political spectrum where -1 stands for extreme left and 1 stands for extreme right.

The following table summarizes the political leanings of the countries during the time periods mentioned. It will facilitate understanding of the graphs that will follow in the next section:

Table 1: Political Leaning Quantification

YEARS	UNITED STATES OF AMERICA	INDIA
1990	1	-1
1991	1	-0.5
1992	1	-0.5
1993	-1	-0.5
1994	-1	-0.5
1995	-1	-0.5
1996	-1	-1
1997	-1	-1
1998	-1	1
1999	-1	1
2000	-1	1
2001	1	1
2002	1	1
2003	1	1
2004	1	-0.5

2005	1	-0.5
2006	1	-0.5
2007	1	-0.5
2008	1	-0.5
2009	1	-0.5
2010	-1	-0.5
2011	-1	-0.5
2012	-1	-0.5
2013	-1	-0.5
2014	-1	1
2015	-1	1
2016	-1	1
2017	-1	1
2018	1	1
2019	1	1

Note, that -0.5 represents centre-left ideology i.e, the Indian National Congress or its alliances. respectively. -1 for India represents the National Front in 1990 and the United Front in 1996-97 that were alliances led by the Janata Dal. +1 in India has throughout this dataset represented a BJP-led alliance. In the USA, -1 represents a Democratic President and +1 represents a Republican President.

PRESENTATION AND ANALYSIS OF DATA

To firstly analyse economic growth, the following table summarizes the data we collected for GNI Per Capita Income, in context of the two countries under study:

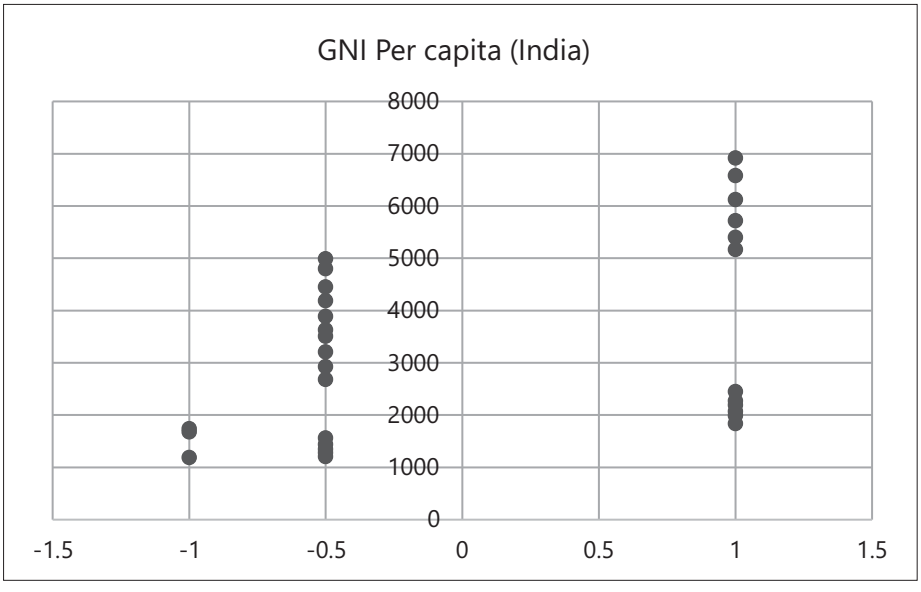
Table 2: GNI Per Capita Income PPP (in current international $)

Year	INDIA	UNITED STATES OF AMERICA
1990	1190	23640
1991	1210	24100
1992	1280	25090
1993	1350	25910
1994	1440	27250
1995	1560	28450
1996	1680	29870
1997	1740	31500
1998	1840	33120
1999	1990	34720
2000	2070	36800
2001	2190	37700
2002	2270	38430
2003	2450	39740
2004	2680	42060
2005	2930	44570
2006	3210	47160
2007	3510	48280
2008	3630	48290
2009	3890	46940
2010	4190	48900
2011	4450	50820
2012	4800	53120
2013	4990	54360
2014	5170	56730
2015	5400	58340
2016	5720	58970
2017	6120	61020
2018	6580	63780
2019	6920	66080

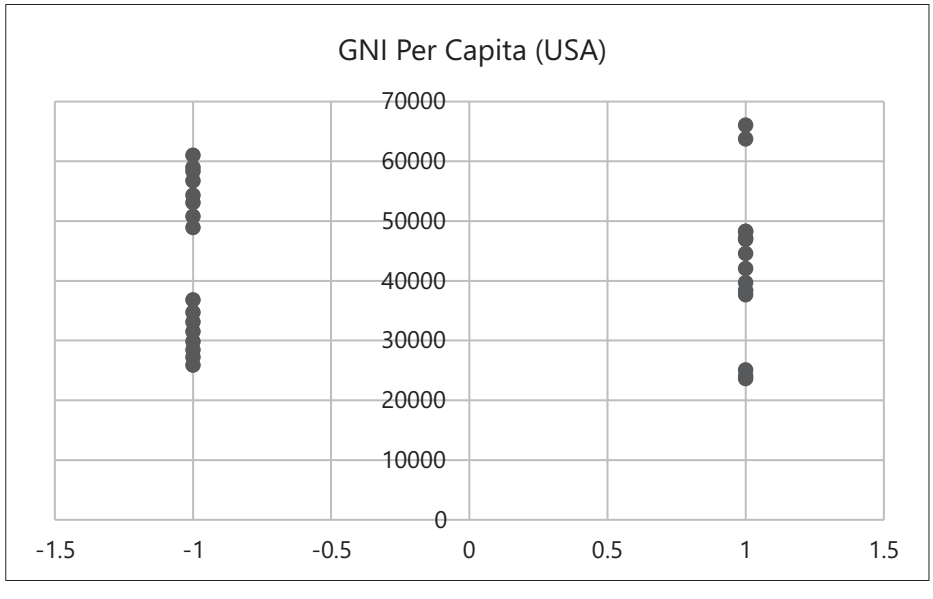
Source: The World Bank, GNI Per Capita PPP (current International $)

This data has been plotted in the following scatter plots, alongside the political quantification data mentioned in table 1 for convenience of analysis:

Graph 1: Correlation of political leaning and GNI per Capita Income (India)



Graph 2: Correlation of political leaning and GNI per Capita Income (USA)



From the above graphs & data, the authors derived the following key analyses:

- The scatter plot of the GNI Per Capita Income (India) showed a positive correlation between economic growth and political leanings increasing towards the right. But a similar relation could not be observed clearly from the scatter plot of GNI per capita income (USA).

- Upon calculation however, it was discovered that India's GNI per capita income and right-wing governance share a positive correlation of 0.404582. Surprisingly, USA's GNI per capita income and right-wing governance shared a negative correlation of -0.02202.

- India had a per capita growth of **30.357%** from **1996-2001**(as governance shifted and stayed from left-wing to right) , **55.25%** from **2004-2009** (now, as governance shifted from right-wing to left) and **33.849%** from **2014-2019** (as it once again shifted from left-wing to right-wing)**.**

- USA had a per capita growth of **21.574%** from **1993-1997** (as power shifted from right-wing to left) , **41.492%** from **1997-2005** (governance changed from left-wing to right again) , **21.965%** from **2005-2013** (once again shifted from right to left) and **8.292%** from **2017-2019** (and finally, shifted from left to right)

- India has lower absolute figures in comparison to the USA but has experienced higher growth rates due to its bigger population and frequently changing dynamics. In direct contradiction to the correlation calculated, India has actually seen the GNI per capita less intensely whenever governance has shifted from Center-Left to Right in comparison to a shift from the right to left.

- In similar contradiction to the correlation, Left governments in the States have propagated lesser growth, with an exception of the last term i.e., Donald Trump's presidency.

The Human Development Index (HDI), as opposed to an indicator of economic growth like Per Capita Income, is a full encompassing indicator. It also takes into account the standard of living and knowledge of citizens,

which makes it an integral part of our research. The following table summarizes the HDI data we collected for the purpose of this study:

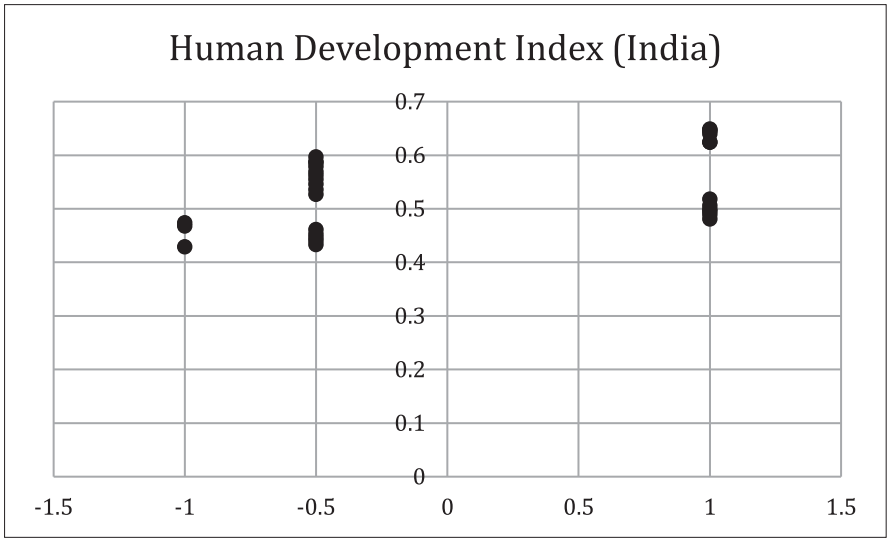
Table 3: Human Development Index

YEARS	INDIA	UNITED STATES OF AMERICA
1990	0.429	0.865
1991	0.433	0.867
1992	0.44	0.867
1993	0.446	0.877
1994	0.453	0.88
1995	0.461	0.883
1996	0.468	0.884
1997	0.474	0.881
1998	0.481	0.889
1999	0.489	0.89
2000	0.495	0.886
2001	0.499	0.889
2002	0.506	0.891
2003	0.518	0.894
2004	0.527	0.897
2005	0.536	0.9
2006	0.546	0.903
2007	0.555	0.906
2008	0.563	0.911
2009	0.569	0.912
2010	0.579	0.916
2011	0.588	0.919
2012	0.597	0.92
2013	0.586	0.918
2014	0.649	0.92
2015	0.624	0.921
2016	0.624	0.922
2017	0.64	0.924
2018	0.647	0.925
2019	0.645	0.926

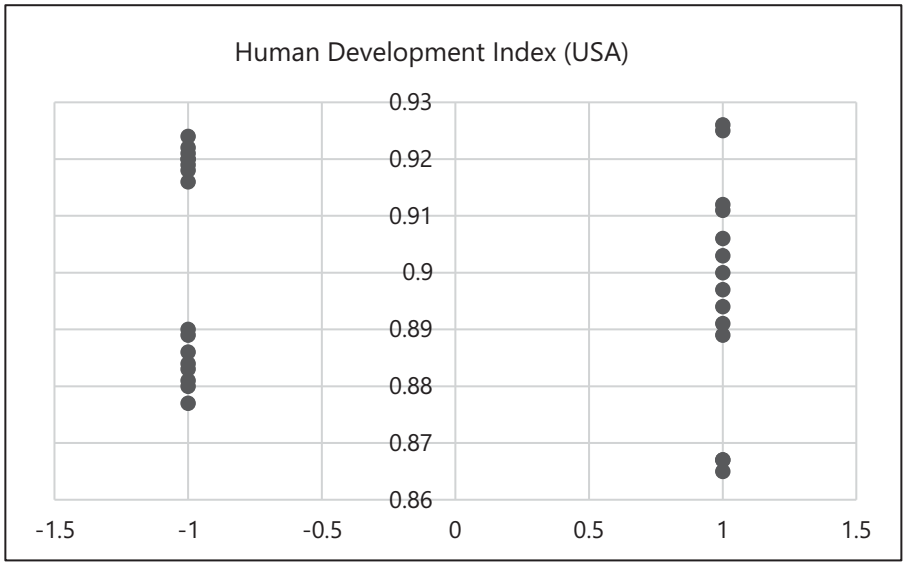
Source: Human Development Report, 2020- United Nations Development Programme

This data has been plotted in the following scatter plots alongside data from table 1:

Graph 3: Correlation of political leaning and human development (India)



Graph 4: Correlation of political leaning and human development (USA)



The key derivations from these graphs & data are as follows:

- From the graphs, a visible positive correlation also exists between India's HDI and right-wing governance. And yet again, such a relationship wasn't visible through the scatter plot of USA's HDI.

- Upon calculation, India's HDI shared a correlation with right-wing governance of 0.425446. In contrast again, USA's HDI shared a negative correlation of -0.13792 with right-wing governance.

- From **1996-2001** , India saw its HDI rise by **6.62%** (center-left to right-wing), substantially grew by **7.69%** (right-wing to left) from **2004-2009** and fell again by **0.61%** from **2014-2019** (center-left to right again).

- From **1993-1997**, the USA saw its HDI rise by **0.456%** (right-wing to left), substantially grew by **2.156%** from **1997-2005** (left to right), **2%** from **2005-2013** (right to left) and **0.216 %** from **2017-2019** (left-wing to right again).

- The trend in India's development was again in contradiction to the measure of correlation. The shift to right governments has led to a lower increase and even a fall in HDI.

- Similarly, the USA displayed a contradiction to the measure of correlation, with a lesser growth in development when governance shifted to the left as in comparison to the right except the last term once again.

CONCLUSION

The paper analysed the direct link between political ideologies, economic growth and human development. It explored whether dissimilarities in political ideologies had led to a distinction in economic performance and human development across two nations standing comprehensively on the political spectrum i.e., India and USA. It is an attempt to investigate the prevailing issue with the aid of data represented across scatter plots, embedding a period of more than three decades. This work varies from the rest of the literature investigating entrenched growth-augmenting policies, typically associated with the left-wing and the right-wing. It presents

evidence showing that right-wing societies and left-wing societies do not have a definite effect on growth or development, per say. The effect of political ideology can differ with each country, their state of development and also the degree of execution of actual left or right-wing ideology by a particular leader. While the figures of correlation told us that growth and development have propagated with the right in India and with the left in the USA, their absolute growth rates measured during change of terms tell a contradictory story. Due to this blatant contrast, one definitive conclusion can not be drawn and might require further study using tools of regression and a wider sample, cross-sectionally as well. The culture, population composition and existing growth of countries might, via their political ideologies, have an impact on the human development of a nation but doesn't prove to be a substantial inference. The study however, has impeded the obstacles of comparability between various national, economic and political contexts inherent to a cross sectional analysis and enabled a better understanding of the transmission mechanism from political ideology to economic growth. As catalogued in multiple studies, we assumed that different government ideologies and policies can have varying growth and development affects across different nations. We finally concluded that such an ideology proceeding is apt for the perusal of the growth reverberations of governmental political leaning, and can be put to better use when framing full bodied solutions, centrally aimed at economic growth or citizen development.

REFERENCES

- Achterberg, P., Houtman, D., & Derks, A. (2011). *Two of a kind? An empirical investigation of anti-welfarism and economic egalitarianism*. Public Opinion Quarterly*, 75*(4), 748–760.

- Alesina, A. (1987). *Macroeconomic Policy in a Two-party System as a Repeated Game*. Harvard University Department of Economics.

- Beckett, A. (2019). *The New Left Economics: How a network of thinkers is transforming Capitalism*. The Guardian.

- Merelli, Annalisa. (2019). *The State of Global Right-Wing Populism in 2019*.Quartz.

- North, D.C., 1998. *Institutions, ideology, and economic performance*. The Revolution in Development Economics 2, 95.

- Okulicz-Kozaryn, A., Holmes, O., & Avery R.D. (2014). *The Subjective Well-Being Political Paradox: Happy Welfare States and Unhappy Liberals*. Journal of Applied Psychology.

DATA SOURCES

- https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD

- http://hdr.undp.org/en/data

Are Stock Market Crashes Driven by Fundamentals or Sentiments of Investor?

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ABSTRACT

Stock market crashes have been occurring for centuries now. Some affected a single economy while some had drastic effects on the global economy. There exists a significant dissimilarity between the crashes of 17th century, 18th century and the conventional i.e., 20th and 21st century crashes. This paper studies the major stock market crashes that have happened since 17th century. A detailed analysis of each crash is undertaken to source out the major reasons behind such crashes. All the crashes are studied along with the macroeconomic and microeconomic variable prevalent at that time. Along with this, the financial market maturity and technological developments were taken into consideration to draw out the difference between earlier and conventional crashes. The paper then critically contrasts the reasons of different crashes and conducts a panel data analysis to determine whether stock market centuries in the earlier centuries a result of sentiments and the conventional crashes are a result of fundamental dysfunctions.

This paper begins with the crashes of 17th century i.e., Tulip Mania crisis of Netherlands by analyzing the root causes of the crash. Then, the paper studies the South Sea Bubble of 1720 and reflects upon the importance of rules, regulations and transparency in prevention of stock market crashes. The paper than moves on to the British Railway crash of 1840 to analyze the impact of investor sentiments on the stock markets and how over optimism can lead to brutal downfalls.

After this, the paper then studies the conventional crashes of 20th century i.e., the Wall Street crash of 1929 and the Asian crisis and contrasts the role of economic adversities in the earlier crashes and the conventional crashes and tries to find out whether the crashes were still a major play of investor sentiments or inherent fundamental abnormalities. Lastly, the paper studies the most recent crashes of 21st century i.e., the Dot Com Bubble Burst, The Crash of 2008 to analyze the impact of technological developments, accounting principles, free flow of information, financial literature etc. on the financial markets' maturity. It tries to find out whether the conventional crashes were a result of economic abnormalities or investor sentiments or a combination of both.

Keywords: Stock Market, Crash, Dot-com Bubble, 2008 Crisis, Asian Crisis, Tulipmania

OBJECTIVES OF RESEARCH STUDY

- To find out the reasons behind stock market crashes in the past centuries
- To find out the reasons behind stock market crashes in the past few decades
- Compare the crashes of past centuries and of the past few years
- To analyze the differences in such crashes and study the trend followed in such crashes
- To find out whether such crashes were a result of investor sentiments or a faulty economy or a mix of both

RESEARCH METHODOLOGY

- Collecting data of stock market crashes from 17th century onwards
- Collecting information of economic conditions prevailing Pre & Post crash.
- Analyzing the data – Each crash was analyzed along with economic conditions and macroeconomic factors. We compared the crashes of earlier centuries to those of recent times in order to find out the drivers of such crashes and whether these drivers were same for both the time periods.

INTRODUCTION

A stock market is an event where stock market indices fall by a significant amount in a day, a few days or even a few months. It is a side effect of a major catastrophic event, recession or crisis or even a bubble burst. Panic selling by investors in reaction to a possible crash or a recession also paves the way towards a stock market crash.

There does not exist a predetermined threshold for stock market crashes but generally a double-digit percentage drop in the stock market indices is considered over a course of few days is considered as a crash. They have a huge impact on the economy as well as the wealth of investors due to the steep fall in asset prices.

So, the crashes of past centuries and of the past few years have been analyzed the find out the real reason why these crashes happened in the first place and finally contrasting such reasons to find out about any deviations in such drivers.

Crashes of the 17th to 19th Century

TULIPMANIA – Netherlands (Circa 1636-1637)

Facts of the crisis – Tulip Mania, also called **Tulip Craze,** a speculative frenzy in 17th-century Holland over the sale of tulip bulbs. Many factors contributed to the conditions that caused Tulip Mania. First off, the coin debasement crisis

of the 1620s led to a period of prosperity and growth in the 1930s. The plague ran parallelly to this prosperity causing the supply of labor to fall while the demand continued to rise given the rising prosperity. The result was rising wages and real income of laborers. The craze reached its height in Holland during 1633–37. Prior to 1633, only professionals and experts were involved in the growing of Tulip but the rising prices and demand of tulip lured the middle-income and poor people towards the trading of tulip. People started mortgaging their homes, estates, industries etc. in order to buy tulip for reselling. Selling and reselling occurred even if the tulips did not exist physically (Forwards and derivatives type contracts), and rare varieties of bulbs sold for the equivalent of hundreds of dollars each. The crash came early in 1637, when speculations around continued momentum in prices will continue or not rose.

Prior to the 1630s, tulip bulbs were only physically traded among growers in the summer, when they could be safely pulled from the ground. This was a traditional spot market where real assets changed hands (In this case cash and tulips). During the 1630s, the tulip grew tremendously and growers started transacting on the basis of tulips still in the ground. The notes had borrower's bulb as collateral and helped the growers in financing the planting and that too at a low-risk credit. However, the notes created a limited opportunity to inspect bulbs or to see them flower, provided no assurance of quality, nor any proof of belongingness of bulbs to the seller, or even of its existence. The delivery of bulbs took place months after the creation of promissory note, and so this financial innovation led to speculatory trading by florists with selling, buying and reselling of notes leading to the creation of a futures market.

In February 1637, the market for tulips collapsed- primarily because of the incapability of people to afford even the cheapest of the tulip bulbs. This was followed by a significant decline in the demand of tulips and as a result the prices of tulips fell to the extent of one-tenth of their former values. There were a lot of disputes over debt in the coming years and those involved fell into severe debt traps.

SOUTH SEA BUBBLE (1720)

Facts of the crisis – The South Sea Bubble was a speculative bubble in the early 18th century involving the shares of the South Sea Company, a British international trading company that was granted a monopoly in trade with

Spain's colonies in South America and the West Indies as part of a treaty made after the War of the Spanish Succession. The company took England's war debt against the exclusive trading rights in South America. Investors were optimistic of the performance of South Sea Company as they thought trading in gold and silver from the mines of South America will garner huge monetary benefits to them and they skyrocketed the South Sea Company's shares and those of similar trading companies to gigantean heights forming a typical speculative bubble. What followed was intense and wild stock speculation from every corner of the British Society, leading to popping of the bubble and stock prices plundered, financially ruining their investors.

The South Sea Company was founded in 1711. During this time, most of the Americas were being colonized and Europeans used the term "South Seas" to refer to South America and other lands located in the surrounding waters.

The British government planned on transferring exclusive trading rights with Spain's colonies which would act as a strong incentive to lure the private sector into assuming government's war debt. The South Sea Company's founders and the government sold the shares of the company to the investors in return for assuming a total of £10 million in short-term government debt. The government promised a perpetual annuity on such amount, paying a total of £576,534 each year, on a perpetual loan of £10 million at a 6% yield. This deal resulted in a steady stream of earnings for new shareholders. On the other hand, to fund such interest obligations, government-imposed import duties on goods imported from South Seas.

Investors embarked upon a speculative frenzy trading in South Sea Company's shares, with stock prices escalating from £128 in January, £175 in February, £330 in March and £550 in May on the grounds that South America has abundance of gold and silver ready to be imported. The company was able to support unusually high valuations due to the fact that it had £70 million of credit granted by the King and the Parliament for expansionary purposes.

In the midst of rising stock prices of the South Sea Company, numerous other joint-stock companies IPOd to extract the benefit of the booming investor demand for speculative investments. Many of these new companies made outrageous, blatant and often fraudulent claims with regards to their

business entity just to have their stock prices skyrocket to new heights. Here are some examples of these companies' business proposals (History House, 1997):

- For supplying the town of Deal with fresh water.
- For trading in hair.
- For assuring of seamen's wages.
- For importing pitch and tar, and other naval stores, from North Britain and America.
- For insuring of horses.
- For improving the art of making soap.
- For improving of gardens.
- For insuring and increasing children's fortunes.
- For a wheel for perpetual motion.
- For importing walnut-trees from Virginia.
- For making of rape-oil.
- For paying pensions to widows and others, at a small discount.
- For making iron with pit coal.
- For the transmutation of quicksilver into a malleable fine metal.

Though South Sea Company share prices were unstoppable, the company's profitability was average at best, despite the fact that directors made a plethora of promises and painted a bright future in the minds on investors. Shares peaked to £1000 per share by August 1720 and then finally plummeted from this level and triggered a panic selling. The panic selling of the Company shares was exacerbated by a plan that the directors initiated earlier in the year with the aim of boosting share prices. The plan was to lend the investor money to buy the shares of the company, which meant that many shareholders had to liquidate their position to be able to pay the first installment of the loan which was due in August of 1720 (Carswell, 1960).

As South Sea Company and other "bubble" company shares plummeted,

leveraged speculators lost their and were declared bankrupt shortly after. When South Sea Company share plunged to a mere £150 per share in September 1720, banks and goldsmiths declared on the grounds of non-collection of debt which they lent to the common folks and aristocrats who went insolvent recently.

BRITISH RAILWAY MANIA BUBBLE (1840-1850)

Facts of the crisis – The UK's Industrial Revolution was progressing at a great pace during the 1840s and a need for a structured and systematic transport mechanism was felt to support the surge in industrial activity which required increasingly large quantities of coal, iron ore and other raw materials and finished goods. The traditional transportation mechanism i.e., the horse drawn carts and transport through the canal were not able to match the needs of the Industrial Revolution. In 1830, Britain (also the world's) first significant modern inter-city railroad opened – the Liverpool and Manchester Railway (L&MR).

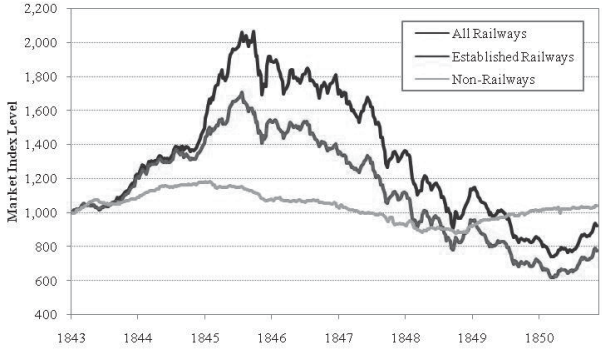
The railroad proved effective and cost-efficient in transporting passengers as well as cargo. An economic slowdown in the late 1830s and early 1840s, high interest rates and anti-railroad protests acted as hurdles for the development of railroads as industrialists and investors found high yielding Government bonds more lucrative than those speculative locomotive stocks. Soon after, the Bank of England cut interest rates to stimulate the economy and, by the mid-1840s, the UK's economy was booming again, driven by manufacturing industries. Investors shifted their money from bonds to railroad shares as their prices were rising fueled by the rise in demand for both locomotive and passenger trains.

The Industrial Revolution gave rise to a significant number of middle class and affluent households, most of whom became a member of the ever-growing investor class. New business ventures, including railroads, were able to raise capital from this well-educated investor class instead of sole arrangement from banks, aristocrats and industrialists which was the case in the past. (Repeal of South Sea Bubble Act of 1720 that limited separate investors to a total of 5).

Railroad companies offered incentives such as buying of shares with only 10% of deposits while granting companies the right to call the rest of the 90% anytime. Financial feasibility of railroad lines was not a pre-requisite for Parliament's approval and most Bills got approved in no time owing to the fact that most Members of Parliament were themselves the shareholders in such companies from the beginning – a glaring conflict of interest. The huge capital roped in by these companies was soon deployed in flawed, impractical and temerarious railway development plans which were poised to fail from the get go.

From 1844 to 1846, an index of railroad company stocks approximately doubled as the speculative buying unfolded.

Figure 1: Market indices for all railways, established railways and non-railways, 1843-50



Source: VoxEU & CEPR

In 1845, the Bank of England tightened its monetary policy by raising interest rates, which has a tendency to pop economic bubbles as capital is no longer as cheap as it once was and now higher-yielding bonds become more attractive to investors again. Soon after, in 1846, the railroad stock index peaked and began to drop rapidly due to the combination of higher interest rates and growing investor realization that many railroads were not as profitable or even as viable as stock promoters made them appear to be. Railroad stocks proceeded to sink by 50% from 1846 to 1850 (Odlyzko, 2010), a plunge that was exacerbated when railroad companies called in the remaining 90% of the money that they had lent to stock investors as a part of their promotional scheme.

What follows from the above discussion is that stock market crashes during the 17-19th century were driven mostly by the sentiments of investors. The tulip crisis was fueled by the greed of traders who were attracted to the lucrative prices of tulips and got overexcited about the derivatives type trading that did not require actual tulips in physical form for entering into contracts and thus drove the price of tulips extremely high. The demand of tulips far exceeded their actual supply and the flow of capital in the market for such a pseudo futures market to such a extent that investors started mortgaging their houses to speculate over promissory notes. What investors forgot in between these events is that the tulips were no more affordable by individuals and so defaults started to happen on promissory notes and tulip prices tumbled tremendously. The problem was the lack of a proper regulation of this pseudo futures market, lack of credit analysis and lack of adequate collateral analysis. A collateral like tulip has uncertainty regarding its quality and so its value should be low but during tulipmania its value was extremely high – only made possible due to the sentiments of investors. Fast forward to the 18th century and we find that markets did not mature that much. The markets were still run on the sentiments of investors as evident from the stock frenzy during the South Sea Bubble. South Sea company witnessed speculative frenzy and high stock prices only on the grounds that their trading with Spanish colonies will reap in immense profits but there were no data backing this up and besides, the last treaty was not that helpful. Along with this the lending by promoters to the investors in order to buy the stocks further fueled the prices to record highs with no strong fundamentals backing it. In order to cash in on the investor frenzy, many companies IPO's but none of them had strong credentials and some of them had ridiculous and extremely vague purposes and made fraudulent and blatant claims. No one was actually analyzing these companies and investors invested on the grounds of promises made by directors and promoters. The actual crash happened only when prices started to decline and investors, who were mostly unaware, started panic selling which dragged the market down and many went bankrupt and insolvent post the crash.

Moving on, in the 19th century, industrial revolution was at its peak and railways was garnering attention and was growing at a high pace owing to the fact that it was the most efficient and cost-effective transportation mechanism for both cargo and passengers. Again, we find that the investor class started investing in railway stocks without analyzing the stocks or

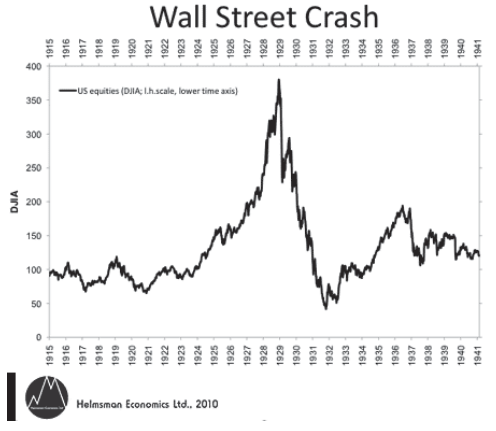
conducting research or conducting due diligence. The revolution increased the disposable income of households and they began investing in locomotive stocks as they had government support (Members of Parliament were themselves investors in locomotive stocks) but were unaware of the deep-rooted inefficiency of railway projects. The only reason these stocks skyrocketed was the investor frenzy that took place and not cause of the profitability of locomotive firms. It follows from the above discussion that crashes in the earlier times were more or less driven by investor sentiments with fundamental factors playing significantly small role.

Crashes of the 20th to 21st Century

The Wall Street Crash of 1929

The Wall Street crash of 1929 was also known as the great crash, it started on 24th of October 1929, known as black Thursday, when panic selling lead the DOW decrease by about 11%. This day was a triggering point for great depression that followed the crash. Before the crash the stock market was high as 381.17 in September and it ultimately down to 41.22 in July, 1932 causing stock market experiencing a loss of 89.2%. Many factors contributed to the Great crash of 1929.

Figure 2: Significant fall in the stock market during 1929



Source: Helmsman Economics

In 1929 the US economy was at its peak, since the economy was shifting from

primary sector to secondary sector and there was growth of the automobile industry, Europe was also depending on US for the supply because at that time the Europe was recovering from world war I. Due to the immense export and the increasing demand the market was in its bullish period. The growing economy lead to increase in the prices of shares which attracted the majority of the people to invest in the stock market. People from the different walks of the life started investing in the market blindly. Whether be rich or poor, they all were investing without the proper knowledge about the market. People used their savings in the market. They even started taking loans to invest. They were buying stocks on margin, means, suppose the price of the share in the market is 100, so they only have to pay 25 and the rest 75 will be paid by the brokerage firm in the form of a loan which they have to repay them. At that time the ratio was as high as 1:3. There was already a speculation going on in the market for long time and it reached its peak in 1929.

During mid-1929 the economy wobbled due to overproduction in various industries creating excess products than demanded. This all resulted in stock piling of the goods by the industries and the losses were suffered by them. As a result, the stock prices in the market started to fall drastically. The losses suffered by companies complied them to reduce their production as well as workforce, resulted in increase of unemployment in the economy as well as enhance the losses faced by these companies. The situation was further heated up by increasing the tariff on imported goods by the fed, in order to increase the demand for their own products especially in case of agricultural goods. In response, many countries start increasing their tariff on American goods making them expensive in the international market. Overproduction, oversupply and higher price due to tariff resulted in a catastrophic consequence for the international trades. The panic selling started on 24th but by the end of the day it was saved by major banks and investment companies who bought huge amount of stocks to reduce the panic selling in the market. But all their effects failed when again on Monday and Tuesday the market crashed.

The Federal Reserve increased the discount rate from 5% to 6%, so as to discourage the widespread speculation going in the market. But this step of fed enhanced the liquidity crisis already being faced in the economy. People had bought their shares through margin call, hence when there was decrease

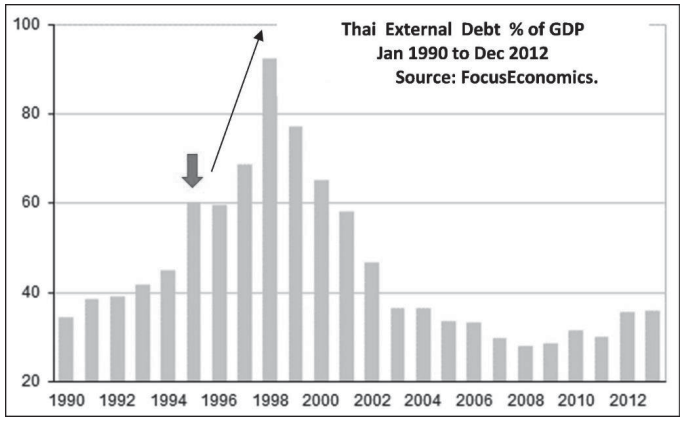
in the price of shares the banks call for the margin. There was already a shortage of cash in the economy since people had already spent their savings as well as borrowed amount on the market and with increasing unemployment in the economy the income level reduced a lot. A huge amount of shares was bought on margin by the public and there was shortage of cash in the economy, as a result, market spiraled down. With these banks faced significant amount of bad loans and people started withdrawing their money, run on banks happened. Many people and investors lost the whole savings and many of the banks and companies went bankrupt. This crash badly affect the American economy and involved almost every American in its way.

ASIAN FINANCIAL CRISIS 1997

Asian Financial Crisis or Asian Contagion started in the summer of 1997. It began with Thailand economy and soon captured many Asian markets including Singapore, Malaysia, Indonesia, Philippines, etc. It started when the Thailand Government decided not to peg their local currency to US Dollar. This decision lead to the drastic decline in the currency value in turn having bad effect on the stock market, import revenues, asset pricing, etc. The cause of the crisis was related to industrial, financial and monetary phenomena.

Like all the other crisis this one also started with the series of the asset bubble. Years before the crisis the developing East Asian economies adopted the export driven growth. In this strategy the government was having a close coordination with the manufactures of the export items, providing with financial support through subsidies, favorable deals and pegging their currency to US dollar so that to maintain a favorable exchange rate for the exporters. This also led to increase in FDI's.

Figure 3: Increase in the borrowing of the government

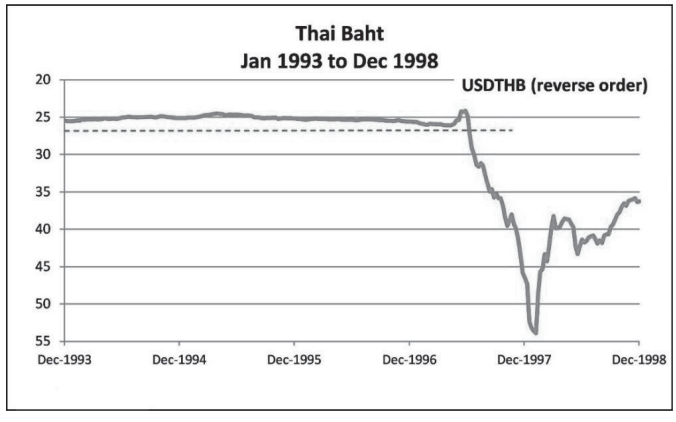


Source: Focus Economics

This strategy undoubtedly benefited the East Asian economy but it also came with certain risks which was overlooked upon. The government was giving a guarantee to these domestic industries and banks to bail them out in case of defaults and also having a close contact with the conglomerates, financial institutions and regulators. All of these created a sense of **Moral Hazard** among the people and they started misusing it by investing in unsound projects. Easily available investors and easy lending led to decrease in the quality of investments.

Further in 1995, Germany and Japan agreed to cooperate with US government on the reversal of **Plaza Accord**. In this these countries agreed to appreciate the US dollar relative to Japan and Germany currency. After this act the East Asian economies faced major financial difficulties as the Japanese and German export became competitive in comparison to eastern exports, the exports of the East Asian countries slumped and there was a decline in the profits of corporates. As with appreciation of US dollars the currencies pegged to it (East Asian currencies) also appreciated. It became very difficult for the East Asian Government to help the domestic industries who were in financial distress because of the above actions. The dollar became expensive and they can't borrow in dollars to subsidiaries these industries and also maintain their currency pegs. All these difficulties reached a boiling point in 1997 and then the Thailand government decided to unpegged its currency.

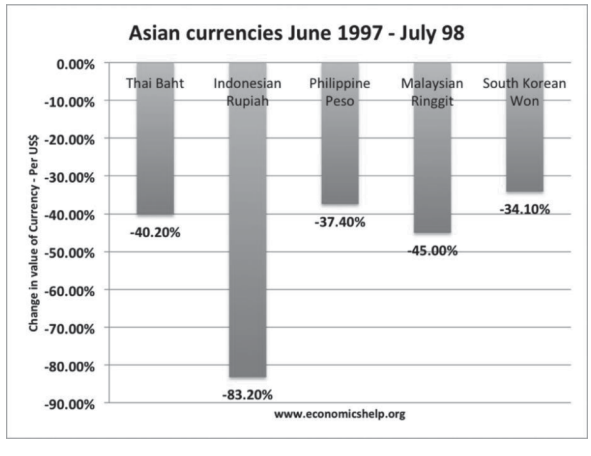
Figure 4: *Depreciation of Thai Baht in relation to US Dollar. Making it expensive in the market*



Source: Word Press

After the decision of the Thailand government there was a series of currency devaluation happened with loss of huge amount of capital. East Asian currencies fell about 38%. There was 60% decline in international stocks as well. The crisis also affected the Russian and Brazilian economies.

Figure 5: Percentage fall in the different East Asian currencies



Source: Economics Help

The situation was handled with the intervention of IMF. It advanced more than $110 billion short-term loans to Thailand, South Korea and Indonesia to

stabilize its economy. But in return these countries had to accept the conditions put forward by IMF. These were imposition of higher tax and interest rates, decrease in public spending, privatization of state-owned businesses and closing of illiquid financial institutions. All these conditions would help them to improve their currencies and resort the confidence on country's solvency.

DOTCOM BUBBLE 2000-2001

Dotcom bubble also known as internet bubble or tech bubble. 1990's was the period where the internet became very popular among the masses and technology was the base of the economy at that time. Since, internet was evolving and gaining more popularity, any new company with dotcom in it or a suffix ".com" where winning the hearts of the investors/venture capitals in the market. The bubble started in the 1990's with the commercialization of the internet. Bullish market was experienced in late 1990's with NASDAQ index raised from 1000 to 5000 within 5 years (1995-2000). The bubble burst in March of 2000 and continued till October 2001 crashing the market by 76.81%. Many factors led to the creation of the bubble some of the highlighted ones are speculation and trend-based investments.

Figure 6: *NASDAQ Index raising 5 folds within 5 years*

Source: Bloomberg

Investors or venture capitalists were blindly investing in internet-based start-ups without even thinking rational whether these companies are true, they would be able to meet their requirements, P/E Ratio, whether they are showing true cash flow, whether they are having any future or not and all the

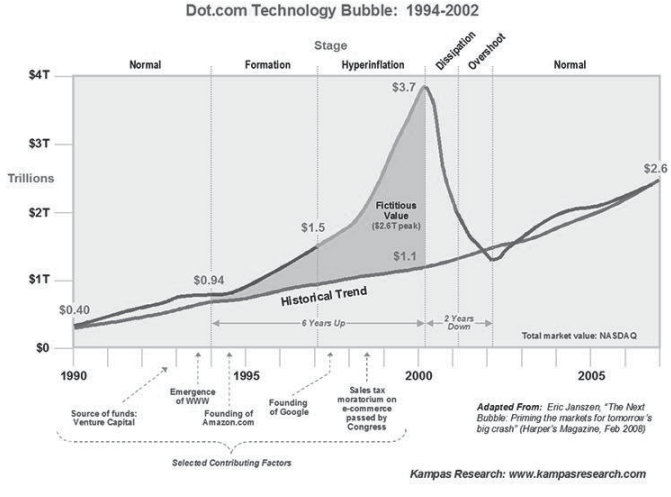
basic fundaments of doing business were overlooked. The startups were also more concern in getting the big fat investment than focusing on the company's future or the profit that need to be generated. They spent majorly on the advertisement than on the core activities of the business. About 39% of venture capital money were invested in the internet companies, 295 out of 475 IPO'S that was issued in 1999 were related to internet companies.

The valuation of these companies was based on very inflated earning and profits. The shares were overvalued in the market. The market speculation, wrong valuation of the shares leading overvaluation, easily available capital, cheap money, market overconfident on the internet companies, were some of the highlighted reasons behind the infamous dotcom bubble of 2000.

On March 10, 2000 the NASDAQ index reached to 5048.62 high. On March 13, 2000 Japan declared about once again entering into recession this had global impact. On April 3, 2000 the verdict for US v/s Microsoft Corp. was released leading to 15% decline in the value of its share with 8% decline in NASDAQ. Like this many important events took place which wiped out around $5 trillion. Many accounting scandals like Enron Scandal, WorldCom Scandal and Adelphia Communication and Corporation Scandal along with September 11 attack further enhance the fall in the stock market.

Figure 7

Total market value of NASDAQ



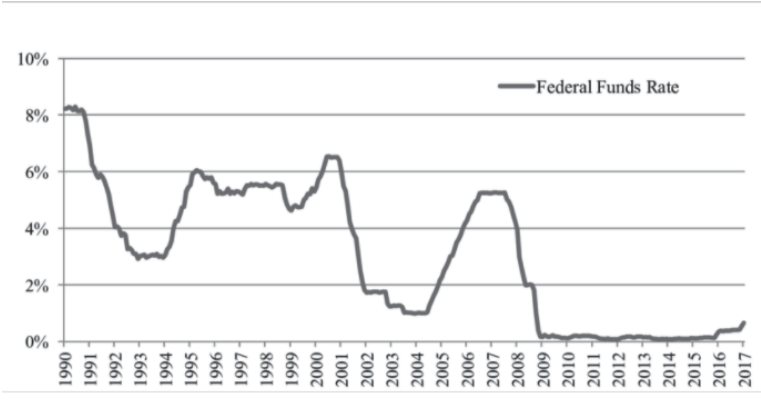
It was also said that the chairman of fed Alan Greenspan had given the warning about the bubble on 5th December, 1996 but he did not tighten up any monetary policy till spring of 2000. Only when all the excess liquidity (created for Y2K bug) was used up by the banks and brokerage then he had no choice but to burst the bubble adding fuel to the fire. During the market peak several leading high-tech companies like Dell and Cisco placed enormous sell order on their stock which led to panic selling in the market. There was about 10% loss in the stock market within a week. Many of the major public traded internet-based companies became bankrupt and enormous amount of dollars were evaporated from the market by the end of 2001, pushing the economy into recession.

Financial Crisis 2008

The Great Financial Crisis of 2007-2009 also known as subprime mortgage crisis started in US with the fall in the US subprime mortgage market in the summer of 2007. The liquidity was the major issue of the crisis. Unlike previous crisis this crash affected all the investors around the world. It shook the global financial system leading to the failure of major investment banks and other **"too big to fail"** financial institutions. The housing bubble started to develop in early 2000's period only. There are many reasons behind the failure of the securitization process as well as the formation of housing bubble and ultimately downturn of entire economy.

The period of boom also saw the financial innovation related to securitization. The banks started adopting OTD (originate to distribute) model. In this model the banks would sell their loans (here talking about home loans or mortgages) to the SPV's (special purpose vehicles) which is a completely different entity, to provide liquidity in the market and banks can continue with their lending process. The SPV's create a pool of these loans which is known as MBS (mortgage back securities) and sell them to the investors in the market. These MBS are graded by the rating agencies and the investors used to get the return according to the risk taken by them.

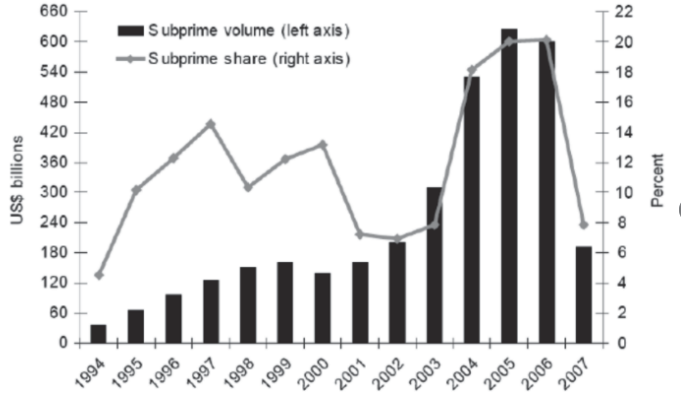
Figure 8: US interest rate – Federal Fund Rate 1990-2017



Source: Research Gate

The Fed reduced the interbank rate from 6.5% in May 2000 to 1% in June 2003, 11 times. This was done to boost the economy since at that time the economy suffered from Dotcom bubble followed by the September 11 terrorist attacks and other scandals in the economy. This resulted in cheap credit which boosted the demand for various durable goods especially houses. The consumers took advantage of the available cheap funds in the economy and that lead to the housing bubble. The subprime mortgage holds a larger share in the overall mortgage market about 20% in 2006.

Figure 9: *Mortgage Market*



Source: Inside Mortgage Finance

Many of these are having low teaser rate. Many of the people purchased the house with intention of living in it but many other also purchased it with speculative intentions. The housing bubble was already created in the economy as a result the house prices were more than the loan amount. Many of the borrowers started to either default intentionally or used to sell the house and repay the loan earlier. All this was having a bad effect on the investors of MBS because they were boning the risk of default as well as prepayment or any other losses. Since because of OTD model the banks were not facing any risk they started reducing the proper diligence process before giving the loans. They started giving the loans to people with poor credit quality, there was about 43% of first-time home buyers with no down payment in 2005. Banks started giving out NINJA loans (no income, no job, and no collateral) and LIARS loans. These subprime mortgages were packaged and repackaged into so called low risk financial instruments such as MBS and CDS leading to the creation of huge secondary market for originating and distributing subprime mortgages. Adding fuel to the fire SEC in October 2004 loosen up net capital requirements for 5 investment banks – Goldman Sachs, Merrill Lynch, Lehman Brothers, Bear Stearns, and Morgan Stanley, increasing their leverage capacity up to 30-40 times.

By 2004 housing market reached its peak and Fed also started rising the interest rate, it reached 5.25% by June 2006 and remained the same till august 2007. By 2006 the housing market started declining. With increase in interest rate and at the same time fall in the housing prices the borrowers of home loans started defaulting, they were not able to save themselves even by borrowing or refinancing or by selling the house as the prices were declining and number of sellers in the market were more than number of buyers in the market. Since many of the mortgage holders own loan amount more than the house value, a situation of crisis started evolving. With increase in number of defaults the value of the MBS formed on these subprime mortgages lost their values. These MBS were also sold outside US like in European countries; they also experienced the consequences of such defaults in the housing market.

By August 2007 it was quite evident that financial market itself couldn't solve the subprime crisis which had already spread across the US borders. The Interbank market providing liquidity around the globe was shut down as participant started losing faith on the quality of collateral. In April 2007 New

Century Financial Corporation, one of the largest subprime lenders filed for bankruptcy followed by in October 2007 UBS a Swiss bank announced $3.4 billion loss from subprime investments. The US economy was in deep recession by 2008 winter. In February the British Government nationalized Northern Rock, a UK mortgage lender. In March Bear Stearns, a US investment bank was acquired by JP Morgan Chase. Fannie Mae and Freddie Mac (formed to provide liquidity to the MBS holders) both were nationalized. In September 2008 one of the largest Investment banking firm Lehman Brothers filed for bankruptcy but government did not bail them out. It was the largest bankruptcy in the US history. The AIG group was also bailed out by the government.

Government formed various programs to bring the economy back to its track and stabilize the financial market. Troubled Asset Relief Program (TARP) was one of such programs with $250 billion funds to save the dying financial institutions. Government also set up various new laws and stricter the older ones so that the same situation can't be repeated again in the future.

If we look at the crisis as a whole then there are certain events and people responsible for the crash:

The banks who were giving out loans without even looking at the credit quality of the borrowers. They were simply consider about selling more and more loans and then selling it to SPV's, since with the sale of the loans the risk was also transferred. They were charging teaser rates and giving out loans without any down payments.

The rating agencies were also hugely responsible for the crisis. These rating agencies had a conflict of interest. They were also not able to understand the securitization process properly. Since these instruments were new in the market, they were having no historical data or experience about how they work. Hence, their rates were faulty.

Investors also over rely on these rating agencies.

Many of the investors as well as banks were having this confidence that the housing market will never fail. It will continue rising. Same way many financial institutions considered themselves "too big to fail" and continued with their

uncontrollable behavior of lending out loans and then repacking it and selling out to investors.

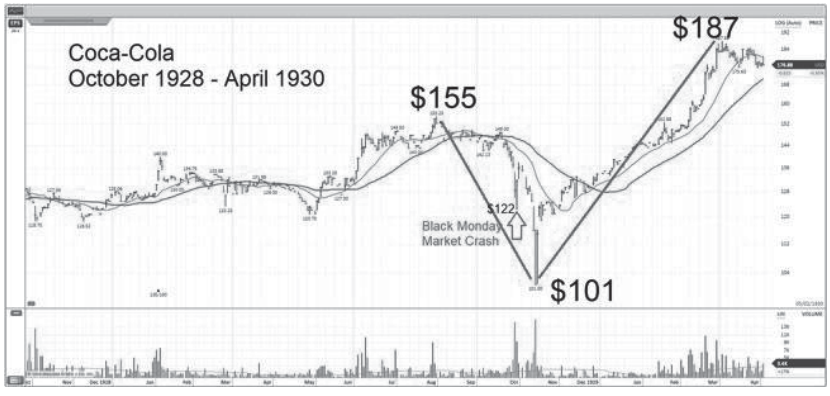
The Great Financial Crisis of 2007-2009 was a very different type of crisis which effected a huge number of investors worldwide. Ever those investors were also affected who were not directly related with the mortgage instruments just because the liquidity was adversely hampered in this depressing situation, many hedge funds and pension funds suffered a huge amount of loss because of this. It damaged the economy and made so many people jobless.

19TH AND 20TH CENTURY SAW THE INVOLVEMNET OF BOTH SENTIMENTS AND FUNDAMENTALS.

After studying some of the major crashes of the 17th, 18th, 19th and 20th century we can compare how the investors as well as the market evolved, no longer the sentiments of the investors drive the market alone, now fundaments also play in an important role in driving the market.

1929 crash was the starting of the translation phase for the market, not only being affected by the sentiments of the investors but also affected and moved by the economic and fundamental factors. We can observe how the market was sky rocket high not only by the craziness of people to invest in the stock market as everyone was doing but also because of various economic factors as well, like the improvement in the manufacturing industry with the decline in the European economy due to world war effects along with the overproduction and oversupply in the economy. **Take the example of Coca-Cola**. It was a young company listed on exchange, during the crash it's shares did fall but it was quick enough to get back to its pre-market crash level by February 1930. The key behind the success was the **rapid sales growth, high profitability and good balance sheet.** The company had a **$6.5 million in cash, with no debt and current ratio of 18:1.**

Figure 10: Coca-Cola Share Price



Source: William O'Neil & Company

With time things started changing and during 1997 Asian crisis, we can observe how the fundaments were the major cause behind the fall of East Asian economy. The government intervention and as well as the super power ruling the currency market exposed the ill effects of globalization and hold of strong economies over weaker ones. The reversal Plaza Accord was a backfire for the East Asian economy and the economic factors were turn around with the appreciation of dollar affecting the markets badly with 38% decline in the East Asian currency value. Because of the dollar appreciation the government was not able to help the domestic industries and ultimately leading to unpegging of the currency. With export driven growth strategy, the companies were in huge debt and with appreciation of dollars the government were also not able to bail them out. For example, **Kia Motors** was declared bankrupt and taken by **Hyundai** although the company had excellent production capacity with good R&D but its balance sheet was filled with debts which it was not able to repay. There were other companies as well which was shut down like Finance One, it was the largest finance company of Thailand and it was declared bankrupt. All this instance clearly indicates that stock markets were completely driven by fundamentals rather than emotions.

Within no thing the world witnessed yet another disastrous crash of 2000-2001 which was followed by the housing bubble of 2008. In both of these situations investors were very emotional and blindly following the trend in the market. Dotcom bubble and housing bubble involved very clear picture

of future but people were being ignorant of the reality. **It is rightly said that speculative bubbles are notoriously hard to identify but when bust it seems obvious.**

In Dotcom bubble people were ignoring the basics of doing the investments. As already observed how tech companies were coming up without any proper future plans. They were just taking the advantage of the foolishness of investors and venture capitalist who were blindly pouring their money in the market without thinking whether they would be able to cash them back. The main aim of majority of tech startups during that time was to raise funds from investors and venture capitals. For instance, there were companies which got liquidated in few months after the issue of their IPO's. One such example is **Pets.com**. This company got liquidated within 9 months of its IPO. Despite having weak business model, it was able to attract big investors like Amazon due to its advertising strategies. Other companies like eToy.com, The Global.com, Webvan.com, etc. were listed but didn't survived in the market because of their failed business plans.

Figure 11: Stock Price of Pet.com after its issue

But this entire crash was not solely based on the foolishness and emotions of investors it was also based on fundamental factors. After the Asian crash the fed has decreased the interest rate to boost the capital flow in the market. The Tax Relief Act, 1997 also push the speculative investment among the masses, as this act lower the top marginal gains tax. All of this encourage the

speculative investment in the market. The failure of the chairman of Fed to control the bubble beforehand although he already saw it coming and gave the warning regarding the same but didn't do anything to control it. It was only in February, 2000 that he increased the interest rate to control the speculative activities in the market which was getting out of control and creating a havoc in the economy, this move was like a fuel to the burning economy. The ill effect of the bubble was already on the forefront and it was at its peak. The economy was already getting into recession and the bubble was about to bust and move of Alan Greenspan further accelerated the process. The various Accounting Scandals like and legal cases also acted as a fuel to fire during the fall of the stock market.

The stocks which survived the crash due to its performance and capabilities are Microsoft, eBay, Priceline etc.

Table 1: Analysis of Stocks During Dot-Com Crisis

Stock Analysis During Dot Com Crisis				
Stock Name	**Price Pre-Crash (January 2000)**	**Post-Crash (October 2002)**	**Price After Recovery**	**Comment**
Amazon.com	$ 69.69	$ 16.55	64 (On May 2007)	Amazon had strong financials backing its stock performance and this was the reason rose to high of 70 USD which it had in 2000 in just 4 years after the NASDAQ hit its lowest in October 2002
Adobe Systems	$ 16.81	$ 14.77	38.84 (On January 2006)	Adobe was dominating the creative software market and was undertaking successful acquisitions which resulted in a strong performance of it. It was diversifying at a good pace and utilizing the internet for its own good and as a result Adobe surpassed the high of 43.66 USD in November 2000 in March 2007
Ebay	$ 6.59	$ 6.52	$ 13.06 (December 2003)	eBay was one of the best performing firm in the dot com era. Its revenue was growing at a good pace even during the dot com bubble with revenue rising from 42.8 Million USD in 2000 to 102.6 Million USD in 2001 to 172.6 Million USD in 2002 and so on. Its revenue grew continuously in the coming decade and that is why recovered in just 2 years and surpassed its previous high because the company's product, online auctions, grew in popularity

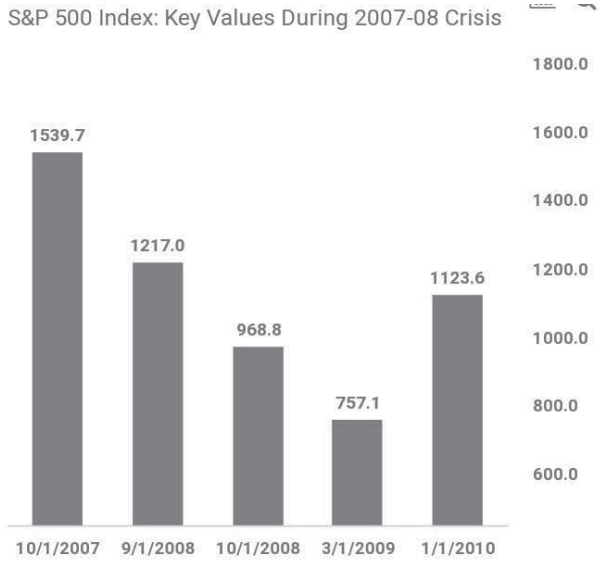
Priceline	$ 86.00	Under $10	After 2009	Priceline was the go-to website for travelers back in 2008-2009 and that helped the company in sustaining itself during the crisis. As soon as the economy started to bounce back, people started booking for travelling and Priceline was one of the best websites at that time. The company had a revamped business model which helped it survive the dot com bubble and even the 2008 crisis due to its acquisitions of Booking.com, Kayak etc. and booming international travel.
Shutterfly	-	-	IPO'd in 2006	Shutterfly is an internet-based personal publishing firm that allows users to create prints, calendars, photo books etc. It survived the Dot Com bubble and IPO'd in 2006 during recovery period at 15.55 USD and went on to grow until October 2007 and then crashing during 2008 crisis but quickly recovered after that despite facing competition from Kodak, Snapfish etc. and surpassed its 2007 high in 2010 and is growing since

The 2000 crash was followed by yet another financial disaster which shock the entire financial system globally. The 2008 crash was based on believe, "too-big-to-fail" by some of the big institutions. They hold this notion that they are too big and even if they were going to fail government have to bail them out or else the system will collapse. But this was proven false with the declaration of bankruptcy of Lehman Brothers. Government did save some of the banks by pouring in the funds or through mergers & acquisition but was in no position to bail Lehman out. Liquidity crunch was yet another important factor to be considered. These SPV's and banks were backing their long-term assets with short-term liabilities which created the maturity mismatch problem and ultimately leading to the liquidity crisis, as the short-term instruments need to be redeemed at maturity but by then the instrument on the asset side has not matured yet. All this led to cash crunching in the economy. It was also seen that even before defaulting Lehman Brothers and AIG were meetings the capital requirements but they were not having the liquidity to roll over their short-term obligations. Not only these factors were responsible for the collapse of the entire housing market or MBS, other factors like decrease in the interest rate by fed about 1% in order to boost up the cash flow in the economy after the Dotcom bubble also encourage more

people to pour in their money in the market. Following the decrease in the interest rate the fed also granted few investment banks the right to reduce their net capital requirement which encourage these institutions to take on risky ventures and increase their leverage as many times as they want to. As all the burden of default were shifted on the SPV's these banks did not care about quality of loans on which these securities were made. The 2008 crash perfectly showcase how multiple of combined fundamentals and sentimental factors affected the investors' decision and impacted the market accordingly.

From the graph given below we can see how the bubble burst affected the market. If we observe clearly, after it hit its lowest the market started rebounding within a year. However, the banking stocks and the companies directly involved in the securitization process took good amount of time to bounce back. This indicates that investors were being rational and not letting other stocks in the market getting much affected by rebounding the market back within a year. Not up to its pre level but still the market as a whole was recovering fast. Hence, we can say that now the investors are more fundamental rather being emotional while investing in the market.

Figure 12: S&P 500 Index Key dates during 2007-08 crisis



Source: Trefis

Both of the crashes stated above are perfect blend of economic and emotional factors. Hence, we can also see through these incidents that how the market is evolving with the decades. With the 1678, 1878, and other older crashes we can easily prove the fact that the market was driven more by the emotional factors then by the fundamental ones. Now with the increase in the flow of information and more global connectivity the market is growing as well as people are becoming more rational and analytical and using fundaments to prove their stand for investing in the market and not blindly following the herd.

CONCLUSION

After analyzing various crashes of different centuries, we can say that with the passage of time the factors driving the market and investors have also evolved. The 17th and 18th centuries market were largely governed by sentiments. Crashes in the earlier centuries were a result of overreaction by investors and not because of disturbances in the economy or other macro level factors. But following these centuries things changed and with 19th, 20th and further there was a blend of sentimental and fundamental factors governing the investor's decisions and ultimately moving the markets. Recent crashes were triggered due to significant disturbances in economy, growth, corporate downfalls and debt defaults etc. Investor sentiments do play a role in such crashes but not to the extent as they did in the earlier times.

It has been observed that any economy can never stay the same or can only follow the upward path. Every economy follows the economic cycle of boom and recession. It is evident that the world will face more crashes like the ones already described and with each new crash there will be discovery of new factors driving the investors and markets. With increasing globalization, it is predicted that the future crashes will be more disastrous, covering several countries.

REFERENCES

- **Adam Hayes** (January, 2021) – *Dutch Tulip Bulb Market Bubble Definition* https://www.investopedia.com/terms/d/dutch_tulip_bulb_market_bubble.asp

- **Adam Hayes** (June, 2019) – *Dotcom Bubble* https://www.investopedia.com/terms/d/dotcom-bubble.asp

- **Alice D. Ba** (January, 2013) – *Asian financial crisis* https://www.britannica.com/event/Asian-financial-crisis

- **Ben Geier** (March, 2015) – *What Did We Learn From the Dotcom Stock Bubble of 2000?* https://time.com/3741681/2000-dotcom-stock-bust/

- **Brian Duignan** (March, 2019) – *Financial crisis of 2007–08* https://www.britannica.com/event/financial-crisis-of-2007-2008

- **Ellen Castelow** (January, 2013) – *The South Sea Bubble* https://www.historic-uk.com/HistoryUK/HistoryofEngland/South-Sea-Bubble/

- **Helen Paul** (August, 2020) – *300 years since the South Sea Bubble: the real story behind the iconic financial crash* https://theconversation.com/300-years-since-the-south-sea-bubble-the-real-story-behind-the- iconic-financial-crash-143861

- **Julie Marks** (January, 2018) – *What Caused the Stock Market Crash of 1929?* https://www.history.com/news/what-caused-the-stock-market-crash-of-1929

- **Justin Kuepper** (May, 2020) – *The Asian Financial Crisis* https://www.thebalance.com/what-was-the-asian-financial-crisis-1978997

- **Leslie Kramer** (January, 2021) – *What Caused the Stock Market Crash of 1929?* https://www.investopedia.com/ask/answers/042115/what-caused-stock-market-crash-1929-preceded-great-depression.asp

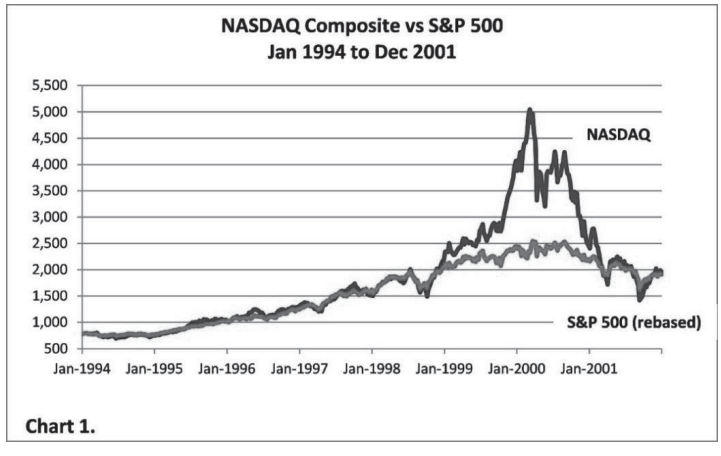
- **Manoj Singh** (January, 2021) – *The 2007-2008 Financial Crisis in Review* https://www.investopedia.com/articles/economics/09/financial-crisis-review.asp

- **Oliver Reynolds** (July, 2018) – *Railway Mania: The Largest Speculative*

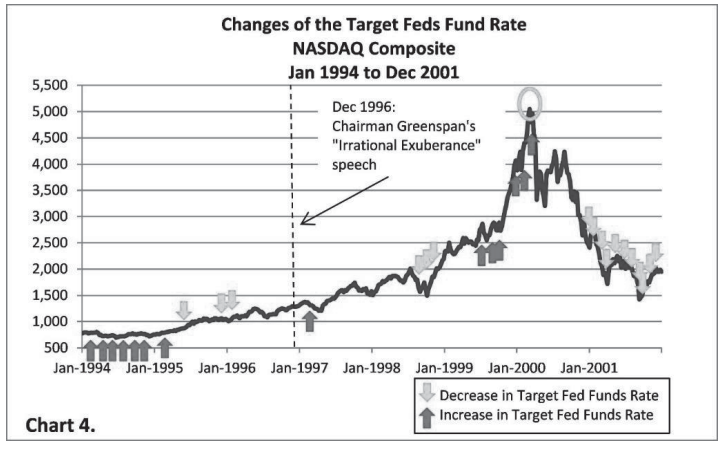
Bubble You've Never Heard Of https://www.focus-economics.com/blog/railway-mania-the-largest-speculative-bubble-you-never-heard-of

- **Tejavan Pattinger** (April, 2020) – *Unemployment during the great depression* https://www.economicshelp.org/blog/162985/economics/unemployment-during-the-great-depression/

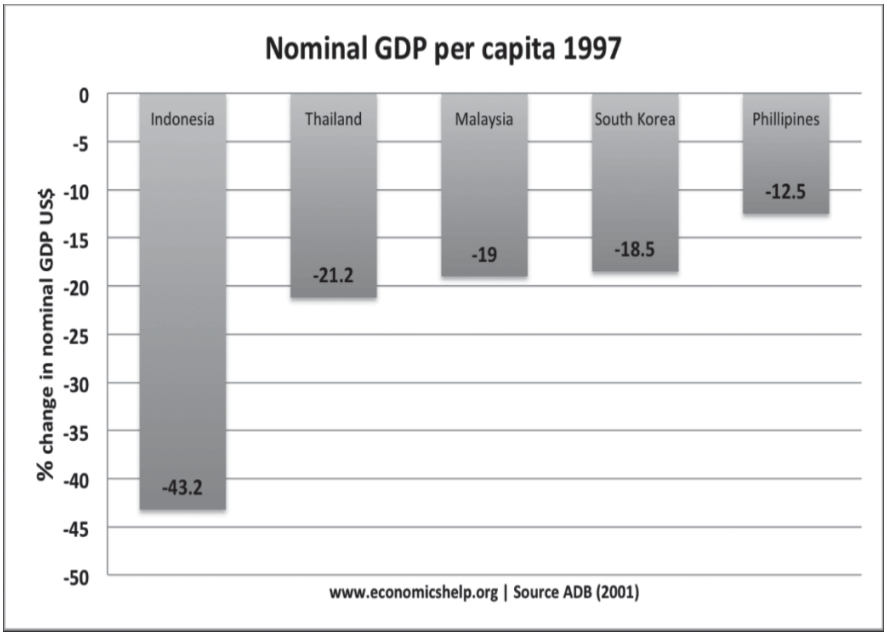
Appendix

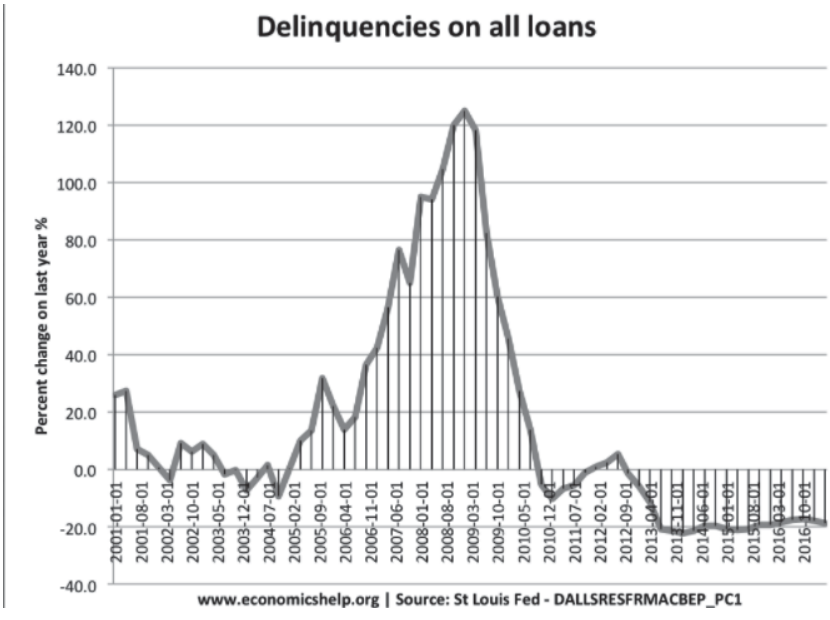


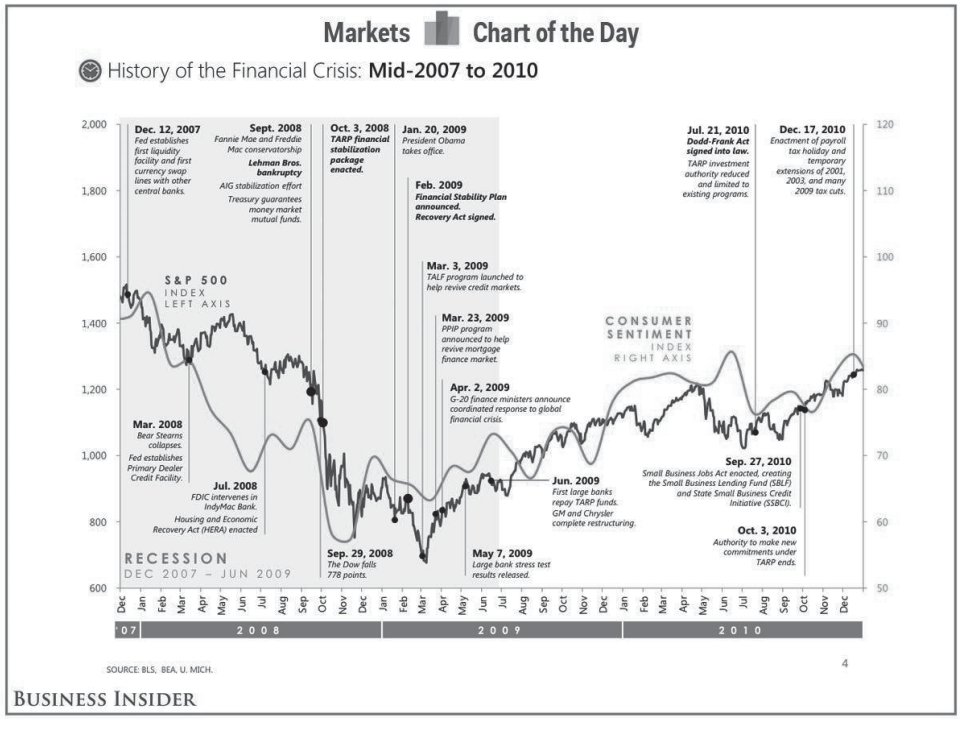
Source: Word Press



Source: Word Press


Nominal GDP per capita 1997
% change in nominal GDP US$
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
-50
Indonesia
-43.2
Thailand
-21.2
Malaysia
-19
South Korea
-18.5
Phillipines
-12.5
www.economicshelp.org | Source ADB (2001)


Delinquencies on all loans
Percent change on last year %
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
-20.0
-40.0
2001-01-01
2001-08-01
2002-03-01
2002-10-01
2003-05-01
2003-12-01
2004-07-01
2005-02-01
2005-09-01
2006-04-01
2006-11-01
2007-06-01
2008-01-01
2008-08-01
2009-03-01
2009-10-01
2010-05-01
2010-12-01
2011-07-01
2012-02-01
2012-09-01
2013-04-01
2013-11-01
2014-06-01
2015-01-01
2015-08-01
2016-03-01
2016-10-01
www.economicshelp.org | Source: St Louis Fed - DALLSRESFRMACBEP_PC1


Markets Chart of the Day
History of the Financial Crisis: Mid-2007 to 2010
Dec. 12, 2007
Fed establishes first liquidity facility and first currency swap lines with other central banks.
Sept. 2008
Fannie Mae and Freddie Mac conservatorship
Lehman Bros. bankruptcy
AIG stabilization effort
Treasury guarantees money market mutual funds.
Oct. 3, 2008
TARP financial stabilization package enacted.
Jan. 20, 2009
President Obama takes office.
Feb. 2009
Financial Stability Plan announced.
Recovery Act signed.
Mar. 3, 2009
TALF program launched to help revive credit markets.
Mar. 23, 2009
PPIP program announced to help revive mortgage finance market.
Apr. 2, 2009
G-20 finance ministers announce coordinated response to global financial crisis.
Jun. 2009
First large banks repay TARP funds. GM and Chrysler complete restructuring.
May 7, 2009
Large bank stress test results released.
Jul. 21, 2010
Dodd-Frank Act signed into law.
TARP investment authority reduced and limited to existing programs.
Dec. 17, 2010
Enactment of payroll tax holiday and temporary extensions of 2001, 2003, and many 2009 tax cuts.
Sep. 27, 2010
Small Business Jobs Act enacted, creating the Small Business Lending Fund (SBLF) and State Small Business Credit Initiative (SSBCI).
Oct. 3, 2010
Authority to make new commitments under TARP ends.
Mar. 2008
Bear Stearns collapses.
Fed establishes Primary Dealer Credit Facility.
Jul. 2008
FDIC intervenes in IndyMac Bank.
Housing and Economic Recovery Act (HERA) enacted
Sep. 29, 2008
The Dow falls 778 points.
S&P 500 INDEX LEFT AXIS
CONSUMER SENTIMENT INDEX RIGHT AXIS
RECESSION
DEC 2007 – JUN 2009
2,000
1,800
1,600
1,400
1,200
1,000
800
600
120
110
100
90
80
70
60
50
'07
2008
2009
2010
SOURCE: BLS, BEA, U. MICH.
4
BUSINESS INSIDER

Devising Optimistic Work Climate for Women

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ABSTRACT

Women are always thoughtful, productive, skilful and perform their work with love, passion, and spirit. Active participation of women has been low due to the disparity in the workplace. The motive of this paper is to highlight, the major challenges faced by working women in India like sexual harassment, gender pay gap, dual career, discrimination at times of pregnancy, and harassing them mentally. This study shows how women workers are more discriminated than men. And to overcome these biases, workplaces must go along with acts & laws and should provide better transport facilities, crèche facilities, and effective work-life balance. To empower women, an organization must follow certain policies and activities.

Keywords: Gender Inequality, Harassment, Work-life Balance, Appraisal, Women Empowering.

INTRODUCTION

Gender disparity implies inequality between genders and gives more favours to men through social norms. Women are frequently limited in employment, education, asset ownership,

deciding for family and society. In past decades, women's responsibility is to be focused on domestic roles but now compared to men, most young women are doing their higher studies and have begun to show their skills in the workplace. Hence this makes women live independently, improving their personal growth and financial stability. Both genders are gradually going to work and no one's profession takes priority over another. In certain places, the level of participation in the workplace between men and women is equal, although the variability can be seen from working in various positions based on their seniority, job experience, and pay scale (Mikkola, A., 2005). Leadership and power are often affected by gender difference. Sexual harassment is one of the important issues which pulls the women's right to work and leads to unethical behaviour in the workplace, which decreases their level of participation. Most of the women earn less compared to men, which creates gender disparity in earnings. This gender disparity can be seen in all countries in one or the other forms. Hence, this paper focus on the workplace gender disparity in India.

GENDER DISPARITY IN INDIA

The injustice of women, which starts in the womb. Abuse of women can take different forms in India like family abuse, acid throwing, workplace sexual assault, forced marriage, and death by dowry. India has the lowest degree of gender equality compared to other countries such as China, Nepal, Srilanka, and Bangladesh (Human Development Report, 2019). The most critical standard of assessing social change is education. Between the ages of 15-24, young women in India may not complete even their primary education. In many schools in rural areas, a common toilet will be used for boys and girls so the parents are hesitant to send girls to school. Based on the census of India 2011, around 64% of women are literate. The future of women is influenced by this. Women are getting very few financial opportunities and some companies are only concerned about their safety, transport service, family commitments, etc. The remaining work provides the difficulties confronting women in the workplace and offers ways to resolve the issues.

MAIN OBJECTIVE OF THE STUDY:

- To impart an analysis of various disparities experienced by women in the workplace.
- This paper endeavours to sketch out some of the feasible management practices that could be performed as fruitful steps to overcome the obstacles, which fosters positive work culture.
- It attempts to elaborate the field of vision on the acts and laws prevailing in the constitution associated with this proceeding.
- The research further facilitates in exploring work-life balance and various principles that empower women's participation, where it brings to light their unique qualities, abilities, and skills which may capitalize women in the work climate.

REVIEW OF LITERATURE

We have a vast variety of literature available on gender disparity covering Indian as well as foreign contexts. However, there were few research papers which are really impactful.

Farhana Mahmood, Sonia Rezina (2016) concentrates on the main factors that contribute towards women empowerment in Bangladesh. It spotlighted a policy framework that should be employee-friendly and to centralize greater on women's rightness apart from equality. The study had a stronger insight on the aspects which impede women's participation, the effects of gender inequality, and the adversities experienced by the working female labour force in Bangladesh. Broadbridge and Hearn (2008) stated significant steps in the scope of sexuality & administration.

Rehman & Azam (2012) deal with significant elements in the diverse socio-cultural climate of Pakistan, which include women's work and family performance. The interpretive phenomenological approach was used, which helped to figure out the challenges, the effective strategies, and techniques that can be used to achieve work-life balance by women entrepreneurs in Islamic patriarchal society. Philip N. Cohen (2013) expressed that

occupational segregation is a significant feature of Gender bias in income which also adds to other aspects of imbalance.

Dragana Stojmenovska et.al., (2021) says that gender gap is seen greater in higher positions of management and considered to be more desirable for males. The gender difference prevails predominantly in supervisory roles which have authority over internal resources and it seems to be lowest in areas related to human resources. Catherine Verniers, Jorge Vala, (2018) documents psychical operations that include perseverance of Gender inequality, which is against women in the workplace. Women's work intimidates their domestic life and children which challenge their role as a mother. In order to promote gender equity, myths of motherhood uphold the gender framework in many countries.

Mitashree Tripathy (2018) has given a detailed study about gender division and inequality in the Indian workplace. Types of gender discrimination were also discussed as well as the ability and skills that women should develop for better living. Organizations must play a vital role in bringing out skilled women, hence they should club together with women employees in achieving their level of confidence and success. To eliminate gender bias, there must be a combination of women's strength and growth. The involvement of Organizations would remove gender disparity from the workplace and society. Sanghamitra Buddhapriya (2009) observed the kinds of work-life assistance that women need from employers to neutralize their both personal lives and work. They scrutinized some of the problems like organisational stages, family type, and married status. They suggested sturdy choices for amenities like adaptable working hours, medical facilities for the elderly, child care convenience, and ductile location.

Meenu Gupta (2018) highlighted the various reasons for low participation and measures to encourage the engagement of women in the workforce. Also indicated that India must uplift many women to work, safety in their travel, and provide maternity benefits. They should track down the individual qualities and attempt ways to maximize them. There was also a similar paper written by Sonia Mehta (2017) that brings out multiple factors that impact the women journalist and key issues for each factor.

Shikha Chandra (2014) exposed the reality of gender discrimination in boardrooms notably in India as well as in other countries. They have attempted to refine society and administration by creating uniform chances regardless of their gender. To lift the women to fill up senior-level management positions, they have suggested certain proposals to be concerned by administrative bodies and government.

The existing literature mainly concentrates on one or other aspects related to gender disparity. There are few papers that discussed various aspects related to gender disparity. This literature gap is the main motivation for taking up the topic "*Devising Optimistic Work Climate for Women*".

METHODOLOGY

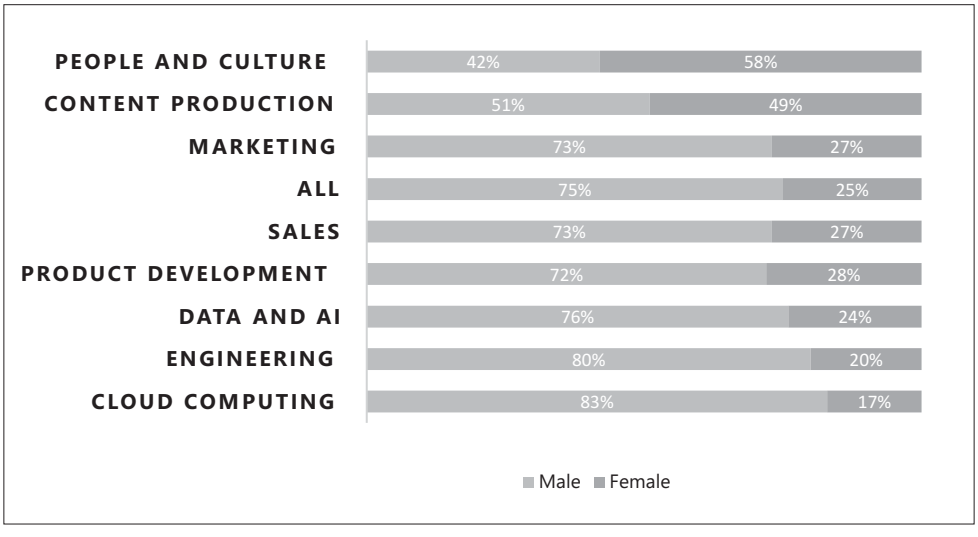
In the present study, secondary data were used to gather information on gender disparity in the workplace. The data are collected from various websites, newspapers, Journals, and existing surveys. To complement the research several other reports and government reports were also used. All these data are useful in the success of this study.

REPRESENTATION OF WOMEN IN DIFFERENT PROFESSIONAL CLUSTERS:

Nowadays, women increasingly bridging their leadership roles at global, state, and local levels in governance, entrepreneurship, employment, and technology. They are ready to face obstacles and started to enter managerial positions, where they have to put forth their entire skills and abilities. Usually, woman executives are required to complete their assignments that are allocated under timelines and are required to complete their task from the organizational point of view so they are task-focused. Women leaders often foster coordination and integration among the team members. Figure 1 shows, the participation of Indian women is low as compared to men in various professional fields. Women's participation in the labour force (24.8%) is lesser than men's (81.6%) (World Economic Forum, 2020). India has been ranked 23rd globally with the women representing in the board at 15.2% which is less than the global average of 20.6%. In the last three years from 2016 to 2019, there has been an increase of women characterization on board from 6.9% to 8.5%. It has also been mentioned that India stands as the third-

lowest country in the women Chief Executive Officer (CEO's) representation and second-lowest for women Chief Financial Officer (CFO's) representation in Asia (Credit Suisse Research Institute, 2019). This situation should be changed and some initiatives should be taken to motivate and encourage women's participation in top-level management positions.

Figure 1-Share of men and women professional cluster in India



Source: WEF (World Economic Forum), 2020

THEORETICAL RESEARCH

Challenges Faced in the Workplace

The succeeding study targets various challenges experienced by working women in the workforce in the era of the 21st century.

- Sexual Harassment

Sexual harassment which demonstrates 'gender inequality', is a major challenge faced by women within the workplace. To resolve the harassment complaints, the law has been ordering to set up a committee within the workplace.

#Metoo campaign owns its origin from Hollywood and agitated the globe entirely and it is strongly correlated between women and the workplace, which created awareness and lighted sexual harassment in the workplace. #Me too movement was founded by African-American activist Tarana Burke, and her main aim was to create a special space for women of colour from socio-economic lower backgrounds in the United States, to come forward, share their experiences and begin the process of healing. It was started with paving an opportunity for women in all the fields to redress their voices against predators (Bhattacharyya, 2018). A single woman complaint might be eliminated but as a group, it's considered in the organizations/institutions. #Metoo movement in India was stimulated as a global campaign against sexual abuse and assault, where they shared their stories about the abuse done by men, who are in control. To avoid sexual harassment, the Ministry of Women and Child Development, has initiated an online complaint box in 2017 for sexual harassment in the workplace, where they received 600 complaints in the first two years.

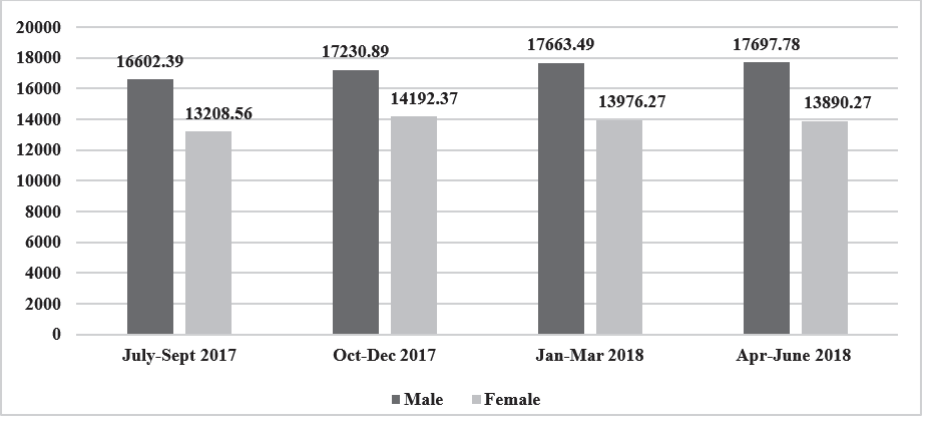
- Gender Pay Gap

The '*Equal pay for equal work*' is a term that everyone should agree on. Regrettably even today, men and women in the same place are being paid different incomes and salaries. In the workplace, there are more senior men compared to women and men appear to be rewarded more than women, which has affected the gender pay gap adversely. Recent studies show that the talents and abilities of women are undervalued and they often earn less money than men for equal jobs (Robin Bleieweis, 2020). Based on the gender roles, the jobs are differentiated and they receive lower salaries and fewer benefits. To fulfil caregiving or other unpaid responsibilities, women are overwhelmingly forced out of the organization, thus they will have less job experience compared to males.

The Period Labour Force Survey (PLFS) for 2017-18 was issued by the Ministry of Statistics and Program Implementation (MOSPI). This survey brings out the picture that the three-fourth female population employed in the workforce are earning less than the male population. Figure 2 shows the pay difference between male and female in India, who comes under salaried employment. This value in the chart indicates the average income of males and females per

month. This chart illustrates that male's average income rises periodically compared to women.

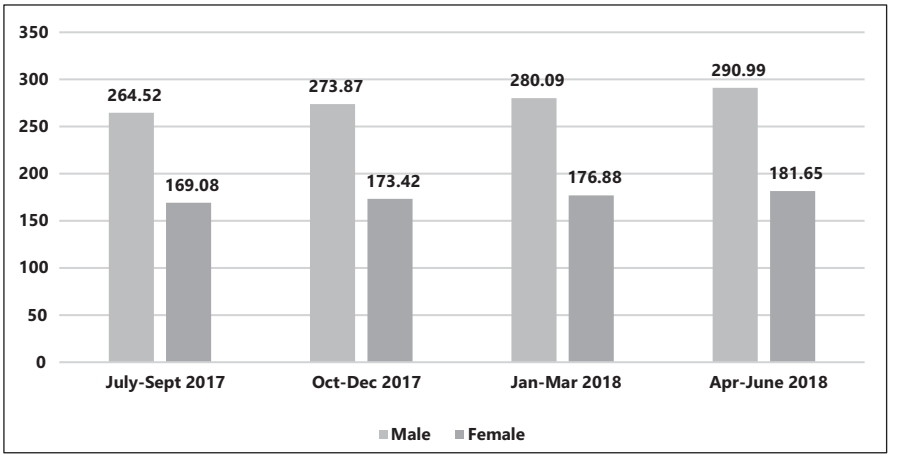
Figure 2-Salaried Employment



Source: The Hindu

Figure 3 shows the pay difference between male and female in India who comes under casual labour. This value in the chart indicates the average income of males and females per month. This chart states that the overall income of male increases regularly as compared to female.

Figure 3-Casual labor



Source: The Hindu

- Dual Career of women

As '*human wants are unlimited*', there is an increase in wants and cost of living, which arises a need for dual-earning in their family to cope up with basic necessaries. So, the women who already played the role of a domestic engineer at home are compelled to play another role in their jobs. They have to face challenges in the workplace as well as in managing their household work. Therefore, she has to balance the job and household activities in her daily routine.

During these covid times, women who played roles like teacher, lecturer, professional, etc have performed their jobs at home and this type of work culture creates stress which affects their household activities. Also, the existence of a male chauvinistic society makes women less eager to continue their career path, as she faces the difficulty of working with male employees and the female workers won't advance help to female subordinates. Hence, by performing these multitasks, women lose their interest in working a full-time job, and either she leaves the job or changes the job, or opt for a part-time job.

- Pregnancy Discrimination

Due to pregnancy or maternity or childbirth-related health issues, women are being treated unfriendly in the workforce, where she is discriminated against her pregnancy. In many job sections (recruitment, promotion, training, employee benefits, etc.) maternity women are refused to allow in an organization (Nisha Kumari Kulkarni, 2019). In recent, companies are backing away the eligible applicants since they do not want workflow disruptions and the manager dismissed pregnant workers from the organization concerning women's safety and health. Reducing maternity leave affects the work-life balance of working women. Pregnancy discrimination complaints could also be based on reducing the number of hours a woman works based on her pregnancy, or the use of other strategies to restrict her production, which may lead to termination. These forms of behaviour are pushing a woman in changing assigned tasks, stopping her from professional development, or looking for higher positions. Valid accommodations are not provided to women in the workplace, as they may not get a distinct work area or allow a

person to stay in one place to complete her tasks or altering routine plans due to health issues and not affording private spaces apart from bathrooms to feed milk for a child in a firm.

- Mental Harassment

It's been around 74 years since independence, but women still didn't get freedom from the sayings like they are unfit, unskilled, incapable, not suitable for jobs, inefficient to perform particular tasks, which creates an attitude among the women to work hard to prove their productivity than men that they are also capable, which is on one side it is appreciable but on the other hand, it creates mental stress among them. These impediments tempt the women to work hard which leads the male superiors to accelerate higher expectations on women which acts as another mental pressure on them. They lose their interest to work if they receive pay less than the men for the same work done. They rarely get promotions and increments in the workplace, to avail these benefits in consideration they are mentally harassed by the male superiors. These circumstances make the women less eager to work.

ELIMINATING GENDER BIAS IN THE WORKPLACE

In times of yore, women played a role only as of the domestic engineer, where they hoard money for sustaining in difficult times and prospects. But presently women started gaining more knowledge about the current economic demands of their families and emerging forward as professionals. Organisations must recognize that women have a great calibre, which fosters optimistic change in the socio-economic conditions of the nation. So, each enterprise should try to implement a far-reaching plan of action to eradicate gender bias in the workplace which is recommended below:

- Crèche Facility

The major impediment which stops women from leaving their home to work is taking care of their children, so the establishment of the crèche in the workplace will be the best solution to overcome this obstacle. It is mandatory for every organization with 50 or more employees to have a crèche (Maternity Benefit Amendment Act, 2017). The crèche needs to be located either within the workplace or within the limits of 500 meters away from the workplace. It

should be made available for eight to ten hours. They should make sure that the crèche is spacious and there must be a minimum gap of 10 to 12 square feet per child. There must be a committee formed within the workplace for monitoring the crèche which may have representatives from creche workers, parents, and administration.

- Safe Transport System

Providing a safe transport system is important to minimize harassment against women. As public transport is considered unsafe for women, it stops the majority of women to go for jobs as they don't have facilities to afford their own transport. If they use public transport, they may experience a severe level of violence and harassment, while travelling to and from work (Farhana Mahmood, Sonia Rezina, 2016). To avoid this and to make them participate in the workforce, they need to be provided with safe transport facilities separate for female workers, if possible, it can also be accompanied by female drivers and attenders.

- Corporate Wellness Programme

In the current world, the workplace is filled with vibes like stress, deadlines, and competitions. These vibes have a direct impact on productivity in the organization as well as in their household activities (Sanghamitra Buddhapriya, 2009). Moreover, in their busy schedule, they won't allocate much time for relaxation, so introducing wellness programmes in the workplace will act as a stress reliever for most of the women. To improve concentration, promote open awareness of thoughts, feelings, and reduce stress practicing mindfulness meditation in the workplace will be a solution.

- Motivational Session

For a woman to overcome all the above-mentioned challenges, organizing some motivational sessions with successful or experienced women from the particular industry will be very helpful. In which they can share about the problems faced, how they overcame them in their career journey, the factors which motivated them to excel in the field, and explaining about the future opportunities available to them. It may act as a remedy for them to overcome all their challenges faced by them. It can act as a catalyst and motivate them

to work hard, which increases their productivity and makes them focus on their career development plans.

- Performance Appraisal Programme

The organization should plan to conduct a performance appraisal once a month to track the employee's progress. It may be more beneficial for the employer as well as employees to look into the fields where they lack, which can be improved and how can be improved by guiding them with solutions (Radhika Kapur, 2019). Also, they should organize a counselling session for employees by appointing a counsellor who has the experience, knowledge, and capability of providing solutions to their problems relating to the workplace. By consulting the counsellor, they may get some idea about how to maintain the work-life balance, reduce stress, perform the tasks efficiently to meet deadlines.

- Acts and laws

The acts and laws which prevails in the Indian constitution to defend women from sexual harassment, to provide maternity benefits, and other conveniences are mentioned below:

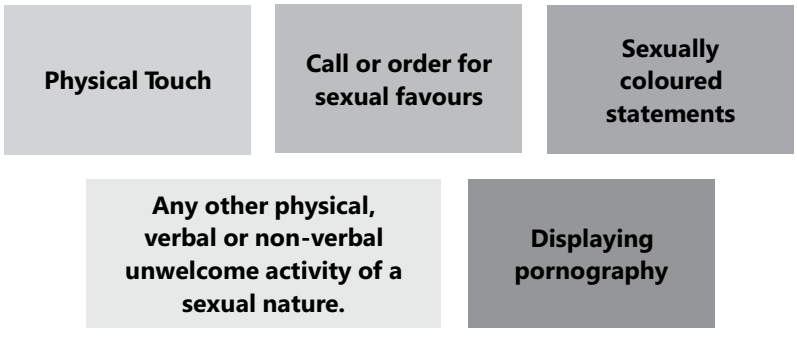
i. Maternity Benefit in India

During the most critical period in a woman's life, several companies in India do their part in keeping and empowering women workers. The Maternity (Amendment) act 2017, has extended maternity leave for working women from 12 weeks to 26 weeks, and if the nature of work permits, women can also work from home (M Gupta, 2018). Nearly four times a day and two breastfeeding breaks are to be entitled till the child turns 15 months. This act applies to any factory or farm or mine or government-owned enterprises and any shop wherein only ten or more workers are employed or are being employed on any day of their employment. To maintain the integrity of motherhood, maternity leave and benefits are offered by ensuring complete and safe maintenance for women and their children while they do not work. Maternity leave and other health care benefits are now more necessary as the numbers of female workers are rising.

ii. The Sexual Harassment of women at workplace (Prevention, Prohibition and Redressal) act, 2013

This act seeks to protect women from sexual harassment at their workplace. This act will give understanding to gender equity, life, liberty, and equality in every working condition. Thus, this act will improve the sense of security among women and improve their participation in work, which may result in growth. According to this act, any of the following circumstances which results in sexual harassment if it occurs or is present or associated with any act or conduct of sexual harassment: Implied or explicit promise in her employment of preferential treatment. The implied or explicit risk in her employment of detrimental treatment. Work interruption or creating a bad atmosphere or hostile work for her. Her health or safety is affected due to embarrassing treatment. In Figure 4, sexual harassment involves unwanted behaviour which is sexually determined, such as:

Figure-4: Unwanted behaviour in sexual harassment



Source: India Fillings (2018)

iii. Shops and Establishments Act/Factories Act, 1948

- There should not be any bias in the case of female employees in terms of hiring, offering salaries or transfers, or promotions.
- In a shop or institution, female workers should be permitted to work between 6 am to 7 pm only.
- Both genders should be prescribed with separate urinals and latrine facilities in the workplace and there should be a secured space for

female workers.

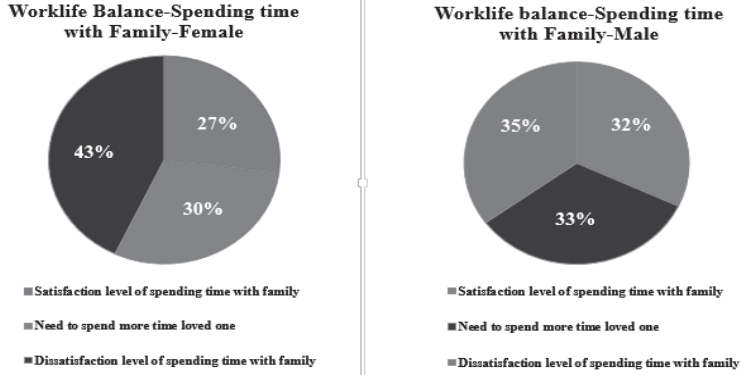
- The factory must provide space for washing and to dry clothes for male and female workers.
- In pressing cotton in the cotton opener, child and female workers are not allowed to work strictly.

Certain Guidelines are also given when a company wants female workers to work. To provide a safe environment, female workers who are employed in night shifts are facilitated with various amenities too.

- Work-Life Balance

In the present era, when industries are changing dynamically and rising at a faster rate, where the work has also been largely affected. Workers have to balance both their jobs and personal responsibilities actively. Due to their lack of commitments, absenteeism, and low retention level the organization faces problems in turnover rates, production, and marketing. Data from the latest ISS study shows that the employees are facing difficulties to cope up with both their career and personal lives. To know the nature of work-life balance in India, Monster performed research in the Indian workplace. Figure 5, illustrates the survey of both men and women in spending their time with loved ones.

Figure-5: Pie chart of Work-life balance-Genders



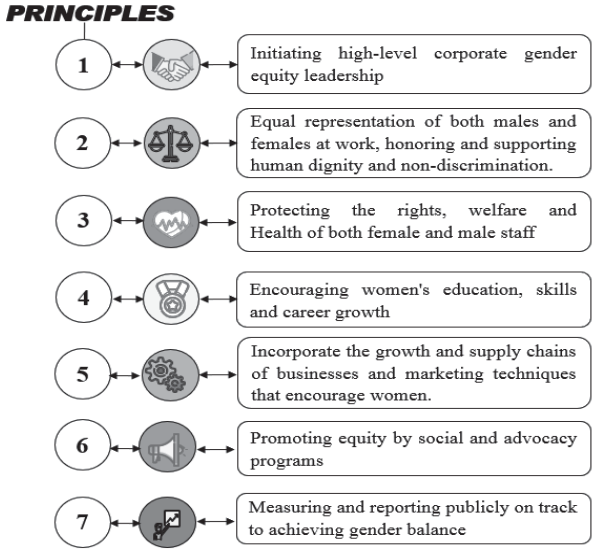
Source: Monster India

The above Pie chart infers that people's common belief about women would be that they want to spend their leisure time with friends and family, the report says that men still want the same thing. The percentage of male who wanted more time with family is slightly higher than female. The majority of the women convey that only 12% of men were taking care of children at the home and 65% of men say women look after their kids. Hence, the organization should provide a perfect work-life balance for both men and women. Rather than just focusing on strength, allowing workers to work as a team, may make things easier to work and different skills come together to simplify the work. In the long-term activities, constructing a timeline will yield better results. Starting a job that they are passionate about it, may help to achieve the perfect work balance by building a career that makes them happier.

- Empowering women

Empowering the working women will encourage them to live their life independently. The development which is more important can be facilitated by factors such as awards, promotion into the senior leadership level, interpersonal communications, and growth opportunities. Women have to accept the vital challenge and boost up further and kick start their confidence and boldness. In terms of gender diversity, women want to take a look at how they are operating, ideas for improving themselves, setting up business objectives, and enhancing themselves to be the best. The companies can also conduct audits on equal pay, must notice the differences in pay scale, and ensure that both genders with equal abilities and skills are paid equally. Figure 6, says about, a binding agreement between the UNGC (United Nations Global Compact) and UN (United Nation) Women, the Women's Empowerment Principles (WEPs) which focus on providing companies with seven key principles on how to enhance equality for women and empowering women in the workforce, global market, and society.

Figure-6: Women's Empowerment Principles



Source: ILO (International labour Organization), 2020

CONCLUSION

The primary aim is to prioritize pivotal features that lie beneath the dormant participation of women in the Indian workplace. Their duties in taking care of menage are the main reason that hampers the progress in their walks of life. The career progression of a well-accomplished woman is vital and any kind of family commitments should not levy any hurdles to this concern. And other challenges like sexual harassment, gender pay gap, dual-career for women, pregnancy discrimination, etc. which were experienced by women are discussed. These features enlightened the concerns on gender bias and its effects on female workers in their working chamber.

Our Nation should try to implement the course of action to empower women to enter the professional world by offering secured travel, cater to infant care facilities, conducting wellness and performance appraisal programmes, and augment mandated maternity benefits through various acts and laws like The Maternity (Amendment) act 2017, Sexual Harassment act, 2013, etc. were communicated. The suggested principles should be discharged by keeping a

proper track and trying to comply with their passion by providing chances, integrity, earnings, and appreciation.

Organisation must attempt to visualize women's proficiency and aptness, elevate the status of skilled women, and try to gain firmness so that they may usher a revolution in their administration. To maintain an equilibrium between work and life dilemma, organisations must offer assistance to the female labour pool for achieving a stable family and ensure that they adhere to women's safety and follow the rules and regulations as prescribed by the government and other agencies.

REFERENCES

- Barati, A., Arab, R. O., & Masoumi, S. S. (2016). Challenges and Problems faced by women workers in India. *Chronicle of the Neville Wadia Institute of Management Studies & Research*, 76-82.

- Bhattacharyya, R. (2018). # metoo movement: An awareness campaign. *International Journal of Innovation, Creativity and Change*, *3*(4).

- Broadbridge, A., & Hearn, J. (2008). Gender and management: New directions in research and continuing patterns in practice. *British Journal of Management*, *19*(s1), 38-49.

- Buddhapriya, S. (2009). Work-family challenges and their impact on career decisions: A study of Indian women professionals. *Vikalpa*, *34*(1), 31-46.

- CHANDRA, M. S. (2014). Gender disparity in boardrooms: A global and local perspective. *Population*, *49*, 48-4.

- Cohen, P. N. (2013). The persistence of workplace gender segregation in the US. *Sociology Compass*, *7*(11), 889-899.

- Gupta, M. (2018). A Study on Ensuring Women Participation at the Workplace. *Bimaquest*, *18*(2)

- India Filings (2018). Sexual Harassment at Workplace - Rules and Regulations. Available at: https://www.indiafilings.com/learn/sexual-

harassment-workplace/#:~:text=Sexual%20harassment%20includes%20unwelcome%20sexually%20determined%20behaviour%20such%20as%3A&text=Any%20other%20unwelcome%20physical%2C%20verbal,conduct%20of%20a%20sexual%20nature.

- International Labour Organization report (2020). Empowering Women at Work. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/publication/wcms_756721.pdf

- Jeremey Pasternak (2019). Examples of Pregnancy Discrimination in the Workplace. Available at: https://pasternaklaw.com/examples-of-pregnancy-discrimination-in-the-workplace/

- Kalpana Pathak (2019). India lags in female representation in senior management: Credit Suisse report. Available at: https://www.livemint.com/companies/news/india-lags-in-female-representation-in-senior-management-credit-suisse-report-11570712711545.html

- Mehta, S. Gender Disparity in an Era of Globalization. *Role of Arts, Culture, Humanities, Religion, Education, Ethics, Philosophy, Spirituality and Science for Holistic Societal Development*, 66.

- Mikkola, A. (2005). Role of Gender Equality in Development-A Literature Review. *Available at SSRN 871461*.

- Monster India. Study: Work-life Balance - Women are more stressed compared to men. Available at: https://www.monsterindia.com/career-advice/study-work-life-balance-women-are-more-stressed-compared-to-men-7995.html

- Nisha Kumari Kulkarni (2019). Pregnancy Discrimination in the Workplace | What you need to Know Available at: https://www.idealist.org/en/careers/pregnancy-discrimination-workplace

- Rehman, S., & Roomi, M. A. (2012). Gender and work-life balance: a phenomenological study of women entrepreneurs in Pakistan. *Journal of small business and enterprise development*.

- Rezina, S., & Mahmood, F. (2016). Gender disparity in Bangladesh and its impact on women in workplaces. *Scholar journal of Business and social science*, *2*(2).

- Robin Bleieweis (2020). Quick Facts About the Gender Wage Gap. Available at: https://www.americanprogress.org/issues/women/reports/2020/03/24/482141/quick-facts-gender-wage-gap/

- Stojmenovska, D., Steinmetz, S., & Volker, B. (2021). The Gender Gap in Workplace Authority: Variation across Types of Authority Positions. *Social Forces*, *1*, 23.

- Tripathy, M. (2018). Breaking the code of gender barrier to leverage the position of women in Indian workplaces. *Space and Culture, India*, *6*(3), 180-193

- Varun B. Krishnan and Srravya C. (2019). The gender Gap in employment is nearly 50 percentage points according to jobs report. Available at: https://www.thehindu.com/data/gender-gap-in-employment-jobs-report/article27852266.ece.

- Verniers, C., & Vala, J. (2018). Justifying gender discrimination in the workplace: The mediating role of motherhood myths. *PloS one*, *13*(1), e0190657.

- World Economic Forum (2020). Global Gender Gap Report. Available at: http://www3.weforum.org/docs/WEF_GGGR_2020.pdf

- Yasmeen Hossain (2017). Workplace harassment problems of women in India and how to deal with them. Available at: https://www.careerizma.com/blog/workplace-harassment-problems-women-india/

Re-engineering Climate Change Solutions: Carbon Credit Trading

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ABSTRACT

Today, climate change stands as the greatest threat to humanity. Melting glaciers, ever-rising temperatures, escalating sea levels, and radical weather patterns are nothing but a wake-up call for us to shun our insatiable quest for economic motives and take rigorous measures to prevent the unprecedented catastrophe that our actions might bring on future generations. To devise a strict plan-of-action in line with the same, the Kyoto Protocol (1997) established the mechanism of Carbon Credit Trading which integrated economic motives with sustainability efforts towards carbon reduction. This paper aims to establish an understanding of the framework while assessing the feasibility of the climate change solution by critically analysing the functioning of the system through the years 2005-20, and highlighting the bottlenecks that severely impaired its efficacy. This is followed by a discussion on the alternate replacement mechanisms rolled-out by the Paris Agreement to remedy the deficiencies in the existing systems.

Keywords: Climate Change Solution, Carbon Credit Trading, Price Discovery Mechanism, Kyoto Protocol, Paris Agreement, Clean Development Mechanism

INTRODUCTION

"Climate change is the single biggest thing that humans have ever done on this planet. The one thing that needs to be bigger is our movement to stop it."

-Bill McKibben

The most direct and obvious outcome of modern civilization has been large-scale industrialization. On one hand, industrialization has undoubtedly been the propelling force behind rapid socio-economic development, but on the other, the very same phenomenon must be blamed for the irreparable devastation that our planet has suffered through over the last few decades.

Humankind's reckless abuse of the environment has single-handedly led to such inordinate altercation of the nature that, today, millions of life forms stand at the threshold of extinction. The aftermath of our very own weapons of mass destruction-climate change poses perhaps the greatest challenge threatening our existence. Engendered by the mass accumulation of carbon di-oxide, methane and other greenhouse gases in the atmosphere, today, the menace of 'global warming' is an alarming hint towards the far-reaching, and overwhelming ramifications that our profit-driven activities would have. The average global temperature has risen over 1.5 degrees Fahrenheit over the last century and, a further 2.5-10 degrees Fahrenheit surge is expected in global temperatures over the next century, as estimated by the Intergovernmental Panel on Climate Change (IPCC). The World Meteorological Department recently stated that the decade 2011-2020 has been recorded as the warmest ever, with GHG emissions reporting record-breaking levels. Extreme weather events, changed migratory patterns of wildlife, retreating glacial sheets, rising sea levels are all warning bells of how serious the human-induced climate crisis has become.

Realising the urgent need for mankind to come up with effective measures to address the problem of climate change, over the years, various conventions like the Kyoto Protocol, and the Paris Agreement rolled-out certain financial solutions in forms of carbon credits and taxes, results-based climate finance etc. that integrated economic motives with long-term environmental goals.

In this paper, a deeper study has been made of the Carbon Credit Trading System- a widely-accepted climate-change solution, with the ultimate aim of gauging its effectiveness as a tool to combat climate change.

LITERATURE REVIEW

There is a rich repository of studies that have evaluated the environmental and economic viability of the Carbon-Credit Trading System. Gupta, Y. (2011) extensively discusses the role of emissions trading in creating a sustained ecosystem of firms and governments seeking to limit industrial GHG pollution together with achieving positive industrial growth. Trivedi, S. (2016) reflects upon the substantial opportunities the carbon credit markets offer and how market participants can bank on them profitably. The study also showed how the market offers an effective risk management mechanism for entities tied by emissions constraints.

Empirical evidence gathered by Rosen, A. (2016), Kim, Y et. al. (2020) shows that there exists a trade-off between GDP growth and declining GHG emissions, although, owing to advancements in technologies and substantial structural changes, economies are showing higher energy efficiency and lowered economic burden, the USA being the leading demonstrator of this decoupling phenomenon.

However, another strand of literature highlights the various lags crippling the market-based flexibility mechanisms, the main contention being how carbon credit trading ultimately results in windfall profits for the most polluters, while having minimal contribution towards adopting sustainable measures (Olsen, 2007). Against this background, this paper sketches the concept of carbon credits and their trading, their effectiveness in meeting emission reduction targets, further examining a wide range of impediments in their implementation and certain key measures that can be undertaken to address the deficiencies in the present system.

RESEARCH METHODOLOGY

This review research paper has used the secondary data published by the World Bank to underpin the emergence of the carbon pricing initiatives at the global level through the 1990s till 2020. A qualitative approach has been

followed to critically analyse the various bottlenecks that impaired the efficiency of the carbon credit trading mechanisms set-up under the Kyoto Protocol (1997), supporting them by citing relevant cases from across the world. Drawing upon a range of sources, the paper also intends to establish how the new developments under the Paris Agreement (2015) have built upon the previous accord, aiming to rectify the issues that plagued the latter.

THE KYOTO PROTOCOL, 1997

The Kyoto Protocol was established under the aegis of the United Nations Framework Convention on Climate Change (UNFCC) in 1997. The international accord (effective from 2005) was ratified by the European Union and 181 signatory countries. As per Article 2, UNFCC, the treaty aimed to stabilise the atmospheric concentrations of greenhouse gas emissions to a level safe enough to curb unwarranted anthropogenic interference with the climate. It primarily focussed on setting individual emission reduction targets binding the member countries for restricting GHG emissions of:

Hydro-fluorocarbons (HFCs)

Perfluorocarbons (PFCs)

Carbon di-oxide (CO2)

Methane (CH4)

Nitrous Oxide (N2O)

Sulphur hexa-fluoride (SF6)

The Protocol is based on the tenet of 'Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC)', acknowledging the differing responsibilities of countries across the globe in addressing climate change. It gives due regard to the fact that much of the emissions can be attributed to the developed and industrialized nations.

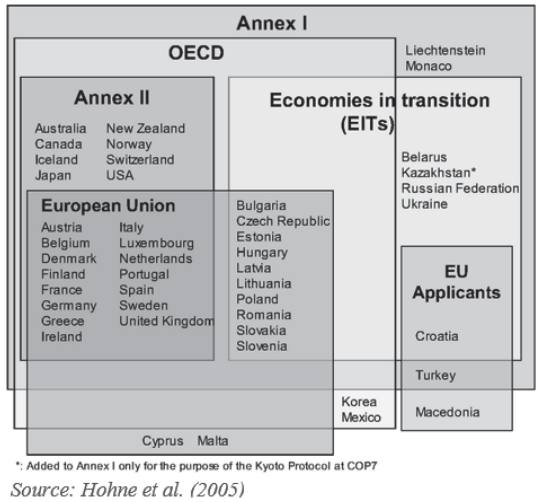
The member countries committed themselves to an average reduction of 5.2% in their GHG emissions from the 1990 levels by the year 2012, which was later followed by an additional commitment period having its own stringent reduction targets and obligations. Mirroring the CBDR-RC principle, the Protocol has categorized the participating countries into three main groups as per their specific commitments:

- **Annex-I Parties:** These are the industrialized nations that were a part of the Organisation for Economic Co-operation and Development (OECD) in 1992 as well as, countries classified as 'Economies in Transition' (EIT). These countries had committed to roll-out non-legally binding national policies and measures to bring down their GHG emissions to the base levels of 1990 by 2000. Under these Annex B Parties are those which had accepted reduction targets for GHG emissions for the period 2008-12.

- **Annex-II Parties:** A further specification of the Annex I parties, these include OECD members from Annex I, that were not EIT Parties. They have an additional obligation to channel financial resources to as well as environmentally friendly technologies to the developing countries and EIT parties to enable them to address and adapt to the climate change impact by undertaking low-carbon investments. These have also agreed to take responsibility of the incremental costs that the aforementioned parties shall incur to implement the emission reduction measures.

- **Non-Annex I Parties:** These are mainly developing countries. They form the most vulnerable countries that are prone to facing the most adverse effects of climate change. Unless provided with adequate monetary and technological resources by the Annex II countries, these nations are not legally bound to reduce their emissions. These include India, Malaysia, Pakistan, Philippines, Brazil, China etc.

Figure-1: Annex I and II Parties under the Kyoto Protocol



Source: Hohne et al. (2005)

CARBON PRICING INITIATIVES UNDER THE KYOTO PROTOCOL

By placing a price on the GHG emissions, it is ensured that the emitters responsible for the same, internalise the negative externality within a broad range of economic alternatives, without passing on the burden to the public. At the same time, it also boosts market innovation and investments in the development of cleaner and cost-effective technologies so that economic goals are also promoted, propelled by newer, low-carbon practices. Rather than stringently imposing who shall pay how much for the emissions through a hard-and-fast rule, carbon pricing provides emitters with the option to either transform their business processes into more energy efficient ones or continue paying additional charges for their emissions. This helps achieve the environmental goals in a flexible and economical manner.

The main types of carbon pricing initiatives include:

1. **Emissions Trading System (ETS):**

By converting GHG emissions into economic commodities, the ETS develops a market mechanism for tradeable emissions permits which businesses can engage in so as to meet their emission targets in a cost-effective manner on a short-term basis.

2. **Carbon Tax:**

This mechanism directly sets a rate of tax on the GHG emissions. It differs from ETS on the lines that here the ultimate emissions reductions cannot be pre-defined, however, the carbon prices are established beforehand.

DEVELOPMENT OF FLEXIBILITY MECHANISMS UNDER THE KYOTO PROTOCOL

Under the Kyoto Protocol, three flexibility mechanisms were established to equip the member countries in meeting their emission reduction targets (Bashmakov et al., 2001) consisting of Clean Development Mechanism, Joint Implementation Projects, International Emissions Trading. The last one revolves around an allowance-based transaction which is based on the establishment of quantitative restrictions on the emissions, whereas the

former two mechanisms are project-based transactions as they enable the generation and trade of emission reductions from different projects through the IET.

1. Clean Development Mechanism (CDM):

The CDM mechanism involves an Annex I country entering into an emissions reduction project in a Non-Annex I country. The former provides financial and technological resources to the latter in lieu of Certified Emissions Reduction (CER) credits. This serves the twin purpose of offering a cost-effective way of meeting emissions targets to the Annex I country, while creating and promoting sustainable development in the Non-Annex I country, in addition to channelising capital resources into the nation.

2. Joint Implementation (JI):

A project-based mechanism, the JI assists developed nations covered under Annex I to meet their emission reduction targets by entering into joint projects with other nations listed under Annex I to earn Emission Reduction Units (ERUs) rather than reducing the emissions in their own country. Under this mechanism, investors engage in emission-reduction projects in the host country that would generate transferable ERUs, which are then subtracted from the host country's allowed emissions and added to the total allowable emissions of the investor country. This aids the investor country in complying with their commitment goals under the Protocol in a very cost-effective manner, while the host country enjoys the benefits of foreign investment and technologies.

3. International Emissions Trading (IET):

The 'Emissions Trading System' is an allowance based tradable permit system for the Annex B countries. Under this system, a country issues permits for emissions in the form of Assigned Amount Units (AAUs) which basically denote the right to emit a certain amount of GHGs. Here, one emission permit or 'Carbon Credit' is equivalent to one metric ton of CO2 emissions. Depending upon their respective commitment levels, entities can engage in the purchase/ selling of these allowances. Thus, a country that has spare emissions permitted which are not required by it, the excess permits can be

sold for some consideration to another country that has exceeded its emissions cap. The system offers an economical solution to industrialized nations that are legally bound by emission reduction targets, as opposed to adopting cleaner production technologies.

CARBON CREDIT TRADING: CONCEPTUAL FRAMEWORK

A brainchild of the Kyoto Protocol, reinforced by the Marrakesh Accords (2001), the carbon credit trading system established a market-based mechanism which converted 'carbon' into an economic commodity that could be freely traded in the markets. With over 15 years since its inception, carbon credits have made their place as widely used instruments that have created a strong international circuit for advancing efforts towards the mitigation of climate change issues. This section discusses the conceptual framework of carbon credit trading, examining the role of the market participants as well as the regulatory bodies.

- **Carbon Credits:** As mentioned earlier, carbon credits are tradeable certificates that confers upon the holder the right to emit carbon dioxide and other GHGs over a certain period. 1 carbon credit is equivalent to one metric ton of carbon dioxide or equivalent mass of any other greenhouse gas (tCO2e). As per the World Economic Forum, Carbon credits can be obtained via the following three routes:

  1. **Reduced Emissions** (Via energy-efficiency measures)
  2. **Removed Emissions** (Via activities like reforesting farmlands)
  3. **Avoided Emissions** (Via activities like refraining from cutting rainforests)

  Carbon credits can further by bifurcated into two groups:

  1. **Voluntary Emissions Reductions (VERs):** These include the carbon offsets for which over the counter trade takes place in voluntary markets. Two of the most common reasons for investing in them are: Corporate Social Responsibility and Public Relations, while others might be environmental and societal benefits, certification requirements, etc.

2. **Certified Emissions Reductions (CERs):** These include all carbon credits or emissions units that operate within a regulatory framework. These are generally sold by specific carbon funds created by large financial bodies. Their trade takes place in compliance markets where the participants are mainly businesses and governments who are required by law to maintain proper accounts of their GHG emissions.

Table 1: Key Differences Between Compliance and Voluntary Markets

Market	Compliance		Voluntary
Credit Type	Permits to Pollute	Project- Based Emission Reduction Credits	Project-Based Emission Reduction Credits
Description	A 'certificate to pollute' one tonne of CO_2e. Number issued corresponds to the emissions cap of the trading scheme	A carbon credit of 1 tonne generated from an emission reduction project	A carbon credit of 1 tonne generated from an emission reduction project
Issued by	National Governments/Agencies	Certification body recognised by the Compliance Scheme e.g. UN Clean Development Mechanism (CDM), California Climate Action Reserve	Independent certification bodies e.g Verified Carbon Standard (VCS), Gold Standard
Examples	European Union Allowance (EUA)	Certified Emission Reduction (CER)	Verified Carbon Unit (VCU), Gold Standard Verified Emission Reductions (GS VER)

Source: ClimateCare Report, (2017)

- **Authority to Issue Carbon Credits:** The Kyoto Protocol set down the limit of GHGs that each signatory country could emit in the form of Assigned Amount Units (AAUs). It depends upon the country then to divide and assign its respective quota amongst different business units, thereby establishing an upper limit on the emissions permitted. The regulatory body administering the emissions in a particular country holds the authority to issue carbon credits there.

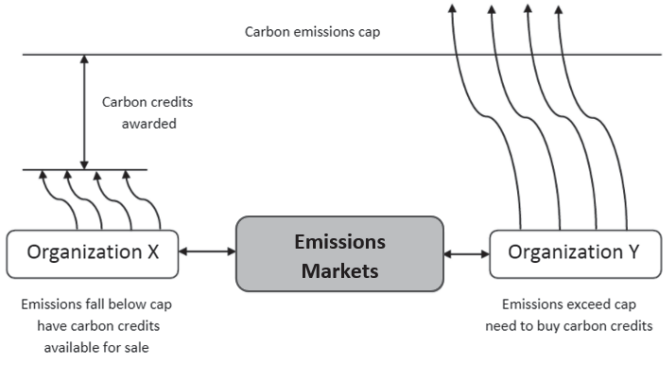
- **Buyers for Carbon Credits:** Carbon credits are purchased by a country as a whole or any company seeking to reduce its carbon footprints.

CARBON CREDIT TRADING PROCEDURE

Carbon trading follows a cap-and-trade mechanism wherein GHG emissions are pegged to an upper limit for a specified time period. It intends to curb pollution by providing licenses offer licenses to both individual firms as well as industries (Stavins, 2008). An entity having emissions lower than the cap and thus, surplus credits would sell them to another entity exceeding its emissions cap (Zeng and Zhang, 2011). The caps are increasingly reduced each year. The World Economic Forum has elaborated how due to a limited number of permits being circulated in the market, an interplay between the market demand and supply forces sets in place. In the initial phase, the emissions permits might either be auctioned to businesses or allocated to them for free by the regulatory authority. With the passage of time, the maximum level of emissions keeps reducing and so does the number of available emissions licenses. This enforces pressure upon the industrial organisations for investing in long-term and cleaner production technologies for keeping their GHG emissions in check. This, thus, aids in the achievement of the ultimate goal of reducing the price of cleaner alternatives in the long run while giving a boost to the innovations being done in the field. Credits are traded in the private and public markets at the current price.

Certain special exchanges have been established for the purpose facilitating carbon credit trading: There are special exchanges that specialize in the trading of the credits: the NASDAQ OMX Commodities Europe exchange, the European Climate Exchange, the Chicago Climate Exchange, and the European Energy Exchange to name a few.

Figure 2: Carbon Credit Trading Mechanism



Source: Morris (2008)

PRICE DISCOVERY MECHANISM IN THE CARBON CREDIT MARKETS

The prices of the carbon credits fluctuate owing to the differences in the market forces of demand and supply. Apart from the market dynamics, there are factors that influence price determination like policy considerations, input costs, industry risks, prices of conventional fuels, emissions targets and so on. A few crucial factors having a bearing on the prices of carbon credits have been listed below:

1. Short Term Factors:

- **Commodity Prices and Fuel Switching:** If the prices of fuels like coal increase, power stations would transition to burning gas, thereby needing less allowances, leading to a price fall.

- **Climatic Conditions:** During colder seasons, more energy usage implies higher emissions which further pushes up the prices. Additionally, the weather conditions also determine the use of renewable source of energies (like solar energy), thus deciding the amount that would be produced using fossil fuels.

- **Market Speculation:** Like any other exchange traded securities, even carbon credits are sensitive to any market information or rumours, especially near the phase when the public anticipates a revision in the legislation.

2. Long Term Factors:

- **Banking of Allowances:** If businesses tend to store the available carbon allowances, with a view to bank up on the surplus in future when prices would be higher, the market forces get distorted and thus, the pricing of carbon allowances bears the impact.

- **Allocation of Credits:** In case the number of allowances that are allocated to enterprises free of any charge goes up, the demand for purchase of carbon credits would decline, thus, reducing the prices of the carbon credits.

- **Economic Output:** Increased economic output would mean higher emissions thus, a greater need for allowances and subsequently, an increase in the carbon credit prices.

- **Regulatory Factors:** These refer to the policy instruments like backloading or changing emissions targets that have a direct bearing on the Emissions Trading System.

- **Renewables Target and Subsidies:** Proactive measures to incentivise the use of renewable sources of energies, decrease the requirements for carbon allowances and hence, help lower the prices.

GLOBAL CARBON CREDIT MARKETS THROUGH THE YEARS

The carbon trading market took its root from 2005, when the market mechanism, formally laid down by the Kyoto Protocol, became effective. The United States, Japan, Germany, and the UK were amongst the first countries to establish complete legal framework and carbon markets by 2007, pioneering the path to accelerated growth of carbon finance.

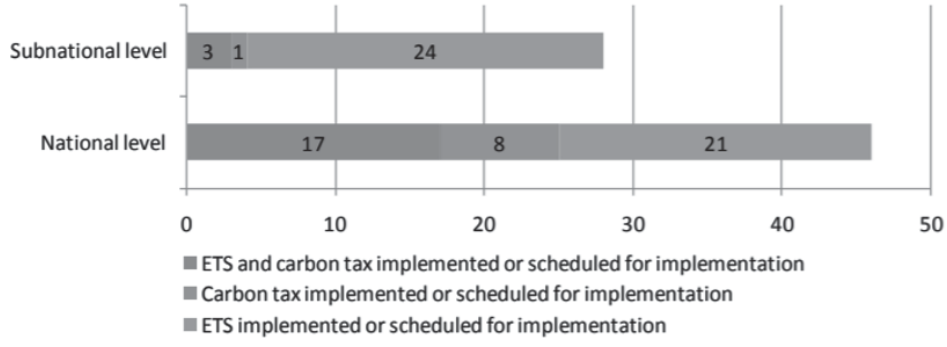
Exhibit-1 shows the total implemented carbon pricing initiatives from 1990-2020. Here it can be noted that the market has significantly bolted post-2006.

Exhibit 1: Number of carbon pricing initiatives implemented on a global basis through the years

Source: The World Bank (2019)

Exhibit-2 shows the carbon tax and ETS initiatives implemented or scheduled for the same by total 46 nations and 28 sub-nations, as of present. As of now, there are 20 active carbon trading systems globally. However, so far, a unified trading market has not yet been established

Exhibit 2: Number of Implemented and Scheduled Initiatives On Global Level



Source: The World Bank (2019)

As of 2020, the cumulative value of global carbon markets touched €229 billion, increasing by nearly 20%, marking the fourth consecutive year of record-breaking growth. Presently, the European ETS holds around 90% of global trade value while also boasting of the highest volume traded at 10.3 Gt., approximately 8 billion allowances. However, as per a report by the International Carbon Action Partnership, in future, China would emerge as the heavyweight, once its domestic market becomes active, as it is projected to double the regulated global emissions from 8% to 14%.

A CRITICAL ASSESSMENT OF THE PROBLEMS PLAGUING THE GLOBAL CARBON CREDIT MARKETS

Based on a critical review of academic literature, Sovakool, B. (2011) outlined some grave bottlenecks that crippled carbon markets and restrained the development mechanisms from meeting the economic and environmental goals largely. These have been grouped under four comprehensive heads, assimilating the problems on the basis of their nature and have been extensively discussed below, citing examples from across the globe to corroborate the findings:

1. Homogeneity Problems:

Right at the grassroot level, carbon markets have an inherent problem of outrightly assuming the relationship between the climate change problem and GHG emissions to be linear. It is important to recognise that neither a one-on-one trade-off between emissions and carbon credits, nor considering carbon credits to be homogeneous, regardless of their time of emission as well as place of emission, is justified. It is often hard to draw out what the 'tipping point' might be where the level of emissions would lead to an altercation in the climatic conditions. Activities like mining and large-scale deforestation could release thousands of tons of carbon and methane emissions into the atmosphere at one go, furthering this, Solomon et. al. (2009) stated that one ton of carbon emission could stay in the atmosphere for up to 35,000 years. Even the ability of forests to store carbon and that of oceans to act as carbon sinks is neither uniform nor permanent due to degradation of soil, drying out or deforestation of plants, increasing ocean acidification, temperature changes etc., thereby affecting the ability of the ecosystem to remove and cycle carbon dioxide in the atmosphere. Thus, both emissions sources and the repercussions are non-linear, unpredictable and often largely irreversible, on a human timescale. Emissions are not identical to each other and their impact also differs by both place and time. This nullifies the very assumption on which global carbon markets function: that each GHG emission has the same value whether released in day or night, on a hot day or cold day, or whether released in Denmark or India.

2. Justice Problems:

These encompass the subject matter related to wealth concentrations amongst the upper strata, dependency issues and subsequently, carbon credit trading sets back the government's efforts to reduce poverty. Global carbon markets have compelled us to question their justification since it has been observed that they benefit the industrialized nations the most rather than those in need of it. Since the CDM is of a competitive nature, only a handful of industrialized (or industrializing) nations are favoured to be host countries like Brazil, India and China. The most backward countries that lack state of the art infrastructure and are in dire need of developmental projects the most are not preferred. This has further deepened the disparities between

countries. Moreover, considering that Western firms, leaders in development of high-technology low-carbon approaches and intellectual property rights, already exploited the most cost-effective and best abatement options for themselves, the developing countries when faced with the obligation to cut down their emissions will be left only with the least economical locations to choose from. This has been referred to as the 'cherry picking' or 'cream skimming' problem.

On account of these three problems of: inclination towards industrialized regions, high dependence of developing economies on Western firms, and the dearth of optimal project sites; carbon markets have failed to:

1. Address the problem of poverty,
2. Achieve millennium developmental goals

Carrying out a meta-analysis of 19 CDM projects, Olsen concluded that there existed a trade-off between the CDM goal of delivering cheap credits and the promotion of sustainable development practices, and the former always had primacy over the latter. He noted that CDM projects failed to encourage renewable energy projects, alleviate poor households, or even promote privileged projects that brought in investments rather than solely focusing on meeting developmental targets, and in several cases, CDM projects had impaired the strive towards environmental goals by massively interfering with land use practices, raising commodity input prices, and resulting forceful dislocation of communities.

3. Information Problems:

These deal with the issues related to transaction costs while engaging in carbon credit trading and the highly inadequate institutional capacity of project approvers, evaluators, as well as auditors. The end-to-end process of project designing, review, approval, auditing as well as credits evaluation involves significant number of years and transaction costs. In case of CDM projects, the prices for credits are not determined until the project is approved, making the mechanism riskier and hence, more expensive due to the added volatility and unpredictability. Moreover, coupled with the lure of high profits, the issue of unpredictability and volatility could enable carbon

markets turning into potential gambling arenas. The next problem relates to the institutional capacity of project approvers. Since these individuals are paid by project developers themselves, they have a strong incentive give their approval for such projects. Moreover, in the United Nations, the global consultants roped in to certify CERs often do not require the requisite knowledge required by the role, remain overworked, and devote insufficient time for the evaluation of each case. Owing to such circumstances, very often such projects that are not worthy enough of being validated get the go-ahead while those that actually deserve do not. The same was revealed by an independent study conducted in China in 2017 which found out that 71% of the CDM projects in hydroelectric power generation should not have been certified at all.

4. Gaming Problems:

These constitute the problems related to emissions leakage in some countries, as well as the mounting pressure across geographies to invest in high-volume but least-cost projects. These can be categorized into three major heads:

1. **Few projects generate revenues that fund the production of fossil fuels:**

   Despite the main premise of CDM being promotion of cleaner energy sources, few projects have been developed and even approved by regulators that instead promote the production of fossil fuels. Although on paper, these projects are well within the purview of CDM, but they produce revenues that are further channelized back into the production of coal and gas. For example: A couple of coal mines in China as well as one oil platform in Vietnam were given the green light for approximately 17 million carbon credits for methane capture and usage in their operations.

2. **Large Scale GHG emissions can be released just for the purpose of engaging in credits trading:**

   Today, the production of carbon credits has become so easy and the value placed for them so high, that more and more projects are being engaged in only to emit more GHGs so as to produce credits. CDM has

made Trifluoroethane (HFC-23) and Nitrous Oxide abatement a very lucrative avenue, although both gases are roughly 300 times more threatening than carbon dioxide. The profits generated out of sale of HFC-23 offsets are worth far more than their production for their traditional purposes-use as refrigerant for ACs and Teflon manufacturing. Such kind of market manipulation has led to even more increased investments being made in carbon intensive processes, that simply go in the opposite direction than what the Protocol intended.

3. **Severe emissions leakages between regions:**

   Mounting evidence suggests that emissions are being shifted or leaked to areas having weak governance structures and relaxed policies and regulations. This leakage can occur in either of the following two ways:

   1. **Locational Leakages:**

      (For example: an American firm shifts its base to an underdeveloped country where regulations can be circumvented easily)

   2. **Market Leakages:**

      (For example: When a change in prices arising due to emission restrictions subsequently leads to a change in energy policies)

   Both these illustrate the following three problems:

   1. They severely dent the environmental effectiveness of GHG emission restrictions.

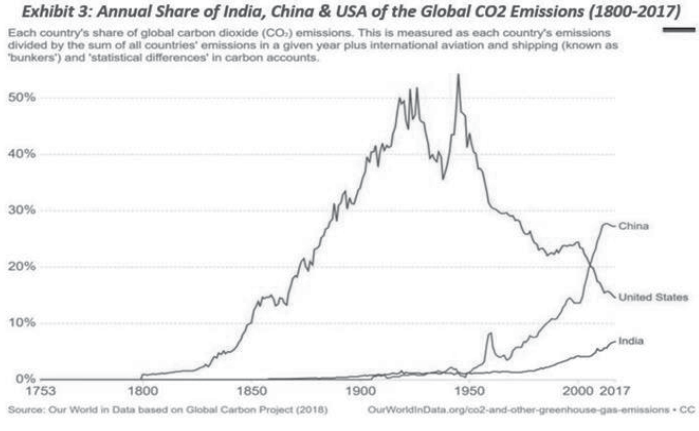
   2. Even without the occurrence of any physical leakages, political constraints may be created due to the adverse effects of the 'fear of leakage' on economic competitiveness.

   3. They further latch the asymmetries between climate-friendly and carbon-intensive regions. Over a due course of time, GHG emissions may get shifted entirely from regulated to unregulated

regions, further making the latter even more GHG intensive making the problem more complex. (Weiner, 2007)

THE KYOTO PROTOCOL THROUGH 2005-2020: A LIMITED SUCCESS?

Going into effect in February, 2005, there is no denying that the Kyoto Protocol was indeed a milestone in international climate policy. Regarded by many as a 'game-changer' initially when it come into force, but, 15 years down the line, quite a few fingers have been pointed at its long-term effectiveness. Experts often say that the greatest weakness of the Kyoto Protocol was that developing countries did not commit themselves to attaining the targets. As aforementioned, the treaty only asked of developing nations to comply voluntarily, which is more symbolic than being stringent in nature. Hence, the disparities present in the contributions to carbon emissions made by such nations is not factored in. Owing to this, it was seen that developing countries that account for 75% of the emissions today, faced no obligations to strictly adhere. Especially in China, India- two global manufacturing hubs that also house the largest populations on the planet, as well as Indonesia, the emissions have significantly risen over the last two decades. Not only does this limit the potential of the Protocol to achieve the objectives but also, outweighs all reductions of other smaller countries.



Carbon emissions from developed nations by the end of the first commitment period of the Kyoto Protocol- 2012, had dropped by 20% vis-à-vis 1990 levels. Although the positive impact of the Protocol on carbon reductions by Annex I parties cannot be overlooked but, during the same

period, global emissions had risen overall by a staggering 38%.

Moreover, the Joint Implementation mechanism, which allowed developed countries to purchase emission credits from developing ones if they were unable to meet targets, ultimately resulted in the former buying their way around their commitments, exploiting the loopholes to skirt pledges. The main logic was to channelise funds towards the most promising and cost-effective, climate-benefitting projects. However, a 2015 report showed that roughly 80% projects under the Protocol's ETS were of poor environmental quality. The joint implementation system in-turn had raised the emissions by around 600 million MT. The main profiteers being Russian and Ukrainian companies, having issued 90% of the credits.

Over the last decade, cap-and-trade systems were increasingly adopted by countries throughout the globe. However, the CDM has been subject to major scepticism by critiques. With an insignificant amount of pay-off to the society, it let the emitters take away substantial profits without fully accounting for the social cost. With unjustified allocations, complex set-ups, regulatory issues and complicated measurements, the object of cutting down emissions somewhere got muddled in the flaws of the system. A confluence of these factors, ultimately revealed the mechanism of 'zero sum transfer' of emissions.

Though the Protocol must be commended as being the first step towards a global commitment to reduce GHG emissions and reverse climate change, however, its effectiveness always remained dubious. Had it been a resounding success, then in countries like India, China and even on an international level, emissions would certainly have been on a downward path to reduce by over 20% in the proposed period rather than being on an upward spiral. A decade into the roll-out of the Kyoto Protocol, in light of the various lags witnessed in the implementation of the proposed mechanisms, pragmatic altercations to the climate change policy were suggested wherein instead of the Kyoto's stringent targets-and-timetables system, prudent measures had to be undertaken to reduce emissions at low costs where possible with a stringent, and centralised control system in place.

PARIS AGREEMENT, 2015: THE WAY AHEAD FOR A STRONGER GLOBAL CLIMATE CHANGE RESPONSE

At the 2015 United Nations Climate Change Conference- COP 21, member nations reached upon a landmark agreement to accelerate the efforts towards a sustainable low-carbon future with the inception of the Paris Agreement. Regarded as one of the most significant global climate treaties till date, the accord builds upon the Convention, charting a new course in the climate protection endeavour which requires all countries to undertake their own emissions- reduction pledges. The treaty focuses on strengthening the collective response to the vicious threat of climate change, while also increasing the ability of countries to individually deal with the impact of the same. In order to achieve the same, ensuring adequate mobilisation of financial resources consistent with low emissions, a new technology framework as well as capacity-building support measures are to be established. The Paris Agreement lays a special emphasis on the inclusion of vulnerable and developing nations and ascertaining supporting action from them, while aligning the same with their national objectives, an aspect that was overlooked by the Kyoto Protocol.

The treaty aims to advance remedy to all deficiencies in the Kyoto Protocol by replacing the CDM and JI with the Sustainable Development Mechanism (SDM), a new and more effective international carbon market instrument to be effective post 2020. Building upon the experience from the Kyoto mechanisms, the SDM will function in a radically transformed world wherein all parties would contribute towards the achievement of the following goals:

1. Contain temperature from rising 2 degrees Celsius above pre-industrial levels
2. De-carbonized global economy by the latter half of the century
3. UN 2030 Agenda's Sustainable Development Goals

Drawing from the high and low points of CDM, the SDM is an improvement over the offsetting precedence by replacing it with a result-based climate tool, backed by a centralised global carbon market. It involves a strong Monitoring, Reporting and Verification (MRV) system to oversee not just the achievement of emission reductions but also, sustainable environmental goals in a way that keeps the problem of conflict-of-interest at bay.

Table 2: Comparing the Building Blocks of SDM and CDM

SDM	CDM
Must contribute to overall emission reductions/net mitigation	Established as a pure offsetting mechanism, shifting, not reducing, emissions
Must account for mitigation targets of all countries under the Paris Agreement, including their progression over time	Based on Kyoto Protocol where developing countries did not have a reduction target and did not take future climate commitments into account
Should promote ambition and encourage implementation of climate friendly policies	Created perverse incentives to continue business as usual practices and in some cases increase emissions beyond business as usual in order to be paid to reduce them
Must reflect and reinforce changing low emission technology and policy landscape	Credited many non-additional projects
Must contribute to real, measurable and long-term mitigation and sustainable development that contributes to overall shift away from fossil fuel lock in	Made questionable contribution to sustainable development, including a lock in of fossil fuels

Source: Carbon Markets Watch Policy Brief, 2017

Under the Paris Agreement, every signatory nation is required to set its own nationally determined target. The countries were required to submit their climate action plans by the end of 2020, known as 'Nationally Determined Contributions' (NDC). NDCs would contain the proposed actions for cutting GHG emissions as well as measures that the respective country would take for building resiliency to adapt to the adverse impacts of climate change. There are not any strict, pre-determined specifications of the amount by which countries should cut their emissions, rather the levels are largely steered by political expectations, varying across countries, with regards to the nature and severity of these targets based on the latest science. Owing to this, NDCs differ a lot in their scope and ambition, mirroring each country's capabilities, and development level. For instance, China has signed up for levelling its emissions by 2030. India set committed to cutting the emissions by 33- 35% below the 2005 levels along with, assuring 40% electricity generation from non-fossil fuel sources by 2030. The United States has set sights to slash its GHG emissions by 26-28% below 2005 levels by 2025.

Over a course of every five years, nations shall assess and report their emissions as well as their implementation efforts. Termed as the 'global

stocktake', the first one has been scheduled for 2023 and for every 5 years thereafter. The primary goal of the same would be to gauge the collective progress made towards the attainment of the goals of the agreement in a facilitative and comprehensive way.

Since 2015, 197 countries have endorsed the Paris Agreement, 2015 while, 190 have formally approved it. Even the world's second largest emitter, the USA, which had withdrawn from the accord in November, 2020, re-entered the same in February, 2021. Meanwhile, nations that have still given their formal approval are: Eritrea, Iran, Iraq, Libya, South Sudan, Turkey, and Yemen.

CONCLUSION

The first-ever binding treaty to steer the global response towards the devastating threat of climate change, the Kyoto Protocol, 1997 surely carved itself as a major breakthrough in the global commitment towards cutting the emissions of climate-damaging gases. Rolled into effect from February, 2005, the treaty established concrete steps, especially for the major emitters, for slowing down climate change, setting the tone for others to follow. It committed 38 industrialized nations to cut down their GHG emissions by an average of 5.2% by 2012 below 1990 levels.

Many believed the protocol to have failed post the withdrawal of the US in 2010, and Canada in 2011. However, by 2012, industrialized countries had already slashed their emissions 20% from the 1990 levels, which was equivalent to 5 times the targets set by the rest of the countries. Germany had cut the emissions by 23% whereas the EU as a whole had reduced them by 19%. On the other hand, in the same period a 38% rise was seen in the global emission levels. Shortly afterwards, varied lags were seen in the implementation of the Kyoto mechanisms that severely impaired the long-term effectiveness of the protocol. The biggest weakness of the treaty was believed to be the non-commitment of developing countries to the climate change response, which as a whole were accounting for more than half the global emissions. Even the Joint Implementation and Clean Development Mechanism established by the treaty were subject to major criticism owing to a muddle of issues ranging from insignificant pay-offs to the society unjustified allocations, complex set-ups, regulatory issues and complicated measurements. An urgent need was felt for a fresh, more stringent and

inclusive treaty which would remedy all such deficiencies recorded in the Kyoto Protocol's case. Thus, the Paris Agreement, 2015 was conceived, which charts a new course in the climate protection endeavour, requiring all countries to undertake their own nationally determined emissions- reduction pledges, built on the pillars of accountability and transparency. The Sustainable Development Mechanism, established under the Paris Agreement, promises to bring about radical change to promote further proactive efforts towards climate action. Although the CDM offers a valuable platform to be constructed upon, a fresh beginning would be made in the true sense if the SDM takes learnings from the former's successes and failures and streamlines them to itself for living up-to its role for being mankind's most influential tool for mitigating climate change.

Today, we stand at a critical juncture where immediately addressing the issue of climate variability has become the need of the hour. What we need, so as to tactfully address the climate change problem, is a system that integrates and reinforces democratic principles and popular participation, social justice as well climate justice. All steps must be taken realising that this daunting challenge doesn't only affect our today, but also our tomorrow by standing as a grave existential threat for all future generations.

REFERENCES

- Denchak, M. (2021). Paris Climate Agreement: Everything You Need to Know. https://www.nrdc.org/stories/paris-climate-agreement-everything-you-need-know.

- Garg, A. K., Mudgal, R. K. and Arya, S. (2017). Benefits and Challenges of Carbon Credit Trading Practices in Organizations- A Case Study. *Pacific Business Review International Volume 10 Issue 1*.

- Gupta, Y. (2011). Carbon Credit: A Step Towards Green Environment. *Global Journal of Management and Business Research. Volume 11 Issue 5*.

- Joyeux, Roselyne and Milunovich, George (2007). Market Efficiency and Price Discovery in the EU Carbon Futures Market.

- Maizland, Lindsey (2021). Global Climate Agreements: Successes and

Failures. https://www.cfr.org/backgrounder/paris-global-climate-change-agreements.

- Martinez-Zarzoso, Inmaculada, Grunewald, Nicole. (2015). Did the Kyoto Protocol fail? An evaluation of the effect of the Kyoto Protocol on CO2 emissions.

- Michaelowa, Axel (2015). Opportunities for and Alternatives to Global Climate Regimes Post-Kyoto. *Annual Review of Environment and Resources, Vol. 40. pp. 395-417*. https://doi.org/10.1146/annurev-environ-102014-021112.

- Nwankwo, Cletus Famous (2018). Global Climate Regime: The Challenges from Kyoto Protocol to Paris Agreement. *Energy Today*. https://www.energytoday.net/economics-policy/global-climate-regime-the-challenges-from-kyoto-protocol-to-paris-agreement/

- Olsen, Karen Holm. (2007). The Clean Development Mechanism's Contribution to Sustainable Development: A Review of the Literature. *Climatic Change 84 (2007), pp.59–73*.

- Paul, Ashim (2010). Carbon Credit and Carbon Trading in India: An Overview. *Business Studies- Vol XXXI & XXXII, 2010 & 2011*.

- Rosen, R. A. (2016). The economics of mitigating climate change: What can we know? *Technological Forecasting and Social Change: Volume 91, February 2015. pp. 93-106*. https://doi.org/10.1016/j.techfore.2014.01.013

- Schauenberg, Tim (2020). Tackling climate change from Kyoto to Paris and beyond. https://www.dw.com/en/kyoto-protocol-climate-treaty/a-52375473

- Sovacool, Benjamin K. (2011). Four problems with global carbon markets: a critical review. *Energy and Environment, 22 (6). pp. 681-69*.

- Stavins, Robert N. (2008). Cap-and-Trade or a Carbon Tax? (Methods for Controlling Greenhouse Gases). *The Environmental Forum 25*.

- Trivedi S. (2016). Global Warming and Kyoto Protocol: Indian Scenario on Carbon Credits.

- United Nations Framework Convention on Climate Change. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

- Yoomi, Kim, Tanaka, K. and Matsuoka, Shunji (2020). Environmental and economic effectiveness of the Kyoto Protocol. https://doi.org/10.1371/journal.pone.0236299

Environmental Impact of Fertilizer and Power Subsidy

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ABSTRACT

Subsidies had evolved as an important component of Indian agriculture system over the years. After independence, India's population was growing at a faster rate in order to fulfil the food requirement for the masses, food production was given the highest priority. The government played a proactive role, it incentivized farmers through various kinds of subsidies to achieve self-sufficiency in food production. The rapid progress in food production is credited to the Green Revolution. But this journey had deepened some environmental issues. The objective of this paper is to study the environmental impact of agricultural subsidies mainly fertilizer and power subsidies in India. This paper analyses the work of various researchers.

Keywords: Eutrophication, Greenhouse Gases, Over-exploitation, Leaching, Nutrient Loss, Fertilizer Subsidy, Power Subsidy

INTRODUCTION

India, in the last 70 years, has transformed itself in the agriculture sector. At one time India was being labelled as "*ship to mouth*", due to heavy reliance on imports for food grains, but now we

are one of the major net exporters for agricultural commodities [Gulati & Saini, 2017]. The performance of agriculture and allied sectors continues to be critical for India's growth story as it ensures food security to about 1.37 billion people, engages more than 54.6% of the workforce and makes a contribution of about 17.8% to the country's Gross Value Added (GVA) [Source: Economic Survey, 2020-21].

This sector, however, encounters complex and often contradictory dynamics as evident from increasing agricultural production and a persistent agrarian distress in different parts of the country. The volatile nature of agriculture due to its heavy reliance on weather conditions, makes it difficult for farmers to earn their livelihood. After independence, though agriculture played a dominant role in Indian economy, agricultural yields were very low and food shortages were frequent, which were solved by the Green Revolution [Tongia 2003, World Bank]. Agriculture sector in India is heavily dependent on subsidies as it supplements the income of the farmer. However, these agricultural subsidies had several shortcomings, according to the **National Institute of Public Finance & Policy** "Subsidies in India are unduly larger, non-transparent, largely input based, poorly targeted, generally regressive & inducing waste & misallocation of resources".

TYPES OF AGRICULTURAL SUBSIDIES IN INDIA

Input Subsidies - These are subsidies granted through distribution of inputs at prices that are less than the standard market price for these inputs. Input subsidies are given to the farmers mainly in the form of fertilizer subsidy, power subsidy, agricultural equipment's subsidy, irrigation subsidy, seed subsidy, credit subsidy.

Price subsidy - It includes mechanisms such as Minimum Support Prices (MSPs) at which the government procures food grains from farmers at a higher price than its market price.

Infrastructural subsidy - Government allowing use of public goods such as roads, storage facilities, power, information about the market, transportation to the ports, etc. at lower prices to the farmers.

Export Subsidy - Subsidies provided to encourage exports of specific

agricultural products. It also gives a comparative advantage to our commodities in the international market.

FERTILIZER SUBSIDY

Fertilizer is a nutrient enriching material, applied to soils or plants in order to fulfill nutrient deficiency, and increase productivity to get maximum output from the plants/crops. With only marginal increase in acreage, the increase in productivity levels play a vital role in the growth of the agriculture industry, as fertilizers account for at least half the crop yield. India has the largest area of arable and permanently cropped land in the world, but, on account of low crop productivity, India still ranks 3rd in case of food-grain production after China and the US [Cassey, 2020].

India's fertilizer consumption had been rising, owing to limited arable land and increasing food demand as the result of increase in population growth. India is the 4th largest producer as well as consumer of fertilizer in the world [Shumacher & Sathye, 1999]. These fertilizers contain three crucial elements required in order to boost the production, i.e., Nitrogen (N), Phosphorous (P) and Potassium (K). These fertilizers are effective only when they are applied in optimal ratio, specific to the local soil and climatic conditions. ICAR had recommended an ideal ratio for N:P:K to be 4:2:1; any diversion from this ratio had a negative effect on the soil. In India, farmers have access to fertilizers below the price of what it actually costs to produce.

Due to the low cost of fertilizer for farmers, it is being misused and diverted for non-agricultural uses. It also limits the expenditure by the government on other sectors, as the government needs to pay a huge subsidy. Fertiliser subsidy increased 88 percent during 2020-21 to Rs 133,947 crore in a revised estimate from Rs 71,309 crore in the budget estimate. The provision for fertiliser subsidy during 2021-22 was kept at Rs 79,530 crore (Source: Ministry of Chemicals & Fertilizers). Together, it is one of the top three subsidies that the government gives on food, fertilizer and fuels.

Subsidy released during 2016-17 - 2021-22

YEAR	Subsidy Released		Total Subsidy (including city compost)
	Urea	P &K Fertilizers	Disbursed
2016-17	51,256.59	18,842.87	70100.01
2017-18	46,953.70	22,237.00	69197.96
2018-19	49,344.86	24,080.35	73435.21
2019-20	54755.49	26368.85	81124.33
2020-21*	94957.42	38080.88	133947.30
2021-22**	58,767.81	20762.00	79529.68

Source: Department of fertilizers, Ministry of Chemicals & fertilizers

** - Revised Estimate ; ** - Budget Estimate*

Environmental Concerns due to Fertilizer Subsidy

Air Pollution

India's fertilizer industry is classified under the **"red category"** of polluting sectors by the Central *Pollution Control Board of India* (CPCB). According to CPCB, fertilizer industry in India can be categorised into three i.e., Phosphatic fertiliser, Nitrogenous fertiliser, and Complex fertiliser. Pollutants like sulphur dioxide, fluoride, and particulate matter are released from phosphatic fertiliser plants. Nitrogenous fertiliser plants are also a source of pollutants like SO2 & NOx, in addition they also release emission of ammonia. Cyanide is produced from ammonia plants when a partial oxidation process is followed. These plants are a major source for arsenic effluents. Naphtha-based fertilizer plants or those with fuel oil or coal-based captive power plants are associated with high carbon emissions and air pollution.

Greenhouse Gas Emissions

High application rate of chemical fertilizer for enhancing crop production is generating numerous harmful greenhouse gases, depleting the protective ozone

layer hence exposing the humans to harmful ultraviolet rays. Agricultural practices are a major source for greenhouse gases, it contributes around 10-12% of total greenhouse gas (GHG) emissions, emits nearly 60% of nitrous oxide and around 50% of methane. Methane emissions from transplanted paddy fields is also a serious concern, as methane is a potent greenhouse gas and its concentration is increased by the application of ammonium-based fertilizers. Compared to CO2, methane has 28 times more potential for global warming [Lenka, Dotaniya, & others, 2016]. All these emissions contribute to global climate change. Nitrogen use efficiency in India is very low, at below 35% in lowland rice and under 50% in upland crops. The rest of nitrogen is lost to the environment which can become nitrous oxide, a *greenhouse gas* (GHGs) contributing to climate alterations, or nitrogen oxide, which contributes to Photochemical smog and ground-level ozone [Chandini, Kumar & Prakash, 2019]. There was a report by FAO, which predicts that by 2030 N20 emissions are bound to increase by 35-60%, due to increased consumption of nitrogen fertilizer.

Water Pollution

Wastewater generated at urea plants contains nitrogen, and cyanides in varying concentrations, which can lead to groundwater and surface water pollution, if not treated properly. Excess nitrogen and phosphorus can be washed from farm fields and into waterways and can also leach through the soil into groundwater over time. High levels of nitrogen and phosphorus can cause *eutrophication* of water bodies, which can lead to hypoxia ("dead zones''), causing fish kills and a decrease in aquatic life. Excess nutrients can also produce *harmful algal blooms* (HABs) in freshwater systems, which not only disrupt wildlife but can also generate toxins harmful to humans. Since nitrate is the most common form of nitrogen present in water. Excess concentration of nitrate (>50 mg NO3/L) in drinking water causes many health related issues like blue baby syndrome in infants, gastric cancer, birth defects, heart disease etc. In India, the permissible level of Nitrate is 45 mg NO3/L, but this limit has been surpassed in 11 states, covering 95 districts and two blocks of Delhi [Lenka, Dotaniya, & others, 2016].

Soil Pollution

For short term gains, farmers tend to use fertilizer recklessly without considering its adverse impact on the soil. Fertilizers more than

recommended lead to formation, accumulation and concentration of mineral salts of fertilizers which results in compaction of layer and soil degradation for long term [Chandini, Kumar, Prakash, 2019]. Overuse of fertilizers has led to problems such as soil acidification and soil crust which further reduces productivity of the soil. It also causes a change in pH level of the soil. Beside this, acidification changes the ratio of natural nutrient contents, which inhibits the growth of crops. Excessive use of fertilizers, brings widespread deficiency of micronutrients like Magnesium, Copper, Zinc etc.

Disruption in Optimum Nutrient Requirement

In 1992, the government decontrolled the prices of Phosphatic & Potassic (P&K) fertilizers on the recommendation of Joint Parliamentary Committee (JPC), in order to reduce its subsidy bill. After that prices of P&K fertilizer shot up, but urea consumption increased many times due to low cost. The prices of urea have been constant over a long period of time, while P & K prices erupted after 2010-11, when a nutrient-based subsidy scheme was accepted for P & K, but not for nitrogenous fertilizers. This further aggravated the N, P & K dis-balance in certain regions such as Punjab & Haryana. Indicating large inefficiency in the use of chemical fertilizers and the current ratio for N:P:K is approx. 6.6 :2.6 :1 (2016-17), which shows a huge variance from the optimal ratio i.e., 4 : 2 : 1, due to lowering in price of urea. [According to *Indian Council of Agricultural Research (ICAR)*]

Consumption of fertilizers

S.No.		1991-92	2000-01	2012-13	2013-14	2014-15	2015-16	2016-17
1	Nitrogenous (N)	80.46	109.2	168.21	167.50	169.46	173.72	167.35
	Phosphatic (P)	33.21	42.15	66.53	56.33	60.98	69.79	67.05
	Potassic (K)	13.61	15.67	20.62	20.99	25.32	24.02	25.08
	Total (N+P+K)	127.28	167.02	255.36	244.82	255.76	267.53	259.49
2	Consumption of NPK, (Kg/Ha)	69.84	89.63	131.36	118.49	127.45	130.66	123.41

Source: Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW)

Diversion of fertilizer

Being super-subsidised, urea is always prone to diversion for non-agricultural use - as a binder by plywood/particle board makers, cheap protein source by animal feed manufacturers or adulterant by milk vendors - apart from being smuggled to Nepal and Bangladesh. When urea is used as an adulterant, it causes many health-related problems, like dermatitis and also high concentration can be damaging.

Government initiative to control menace of fertilizer subsidy

New Urea Policy - 2015: it was launched by the Department of fertilizers with the objective to maximize the indigenous urea production, promote energy efficiency in urea production and rationalize subsidy burden.

Neem coating of Urea: Department of Fertilizers has made it mandatory for all the domestic producers of urea to produce 100% Neem Coated Urea with an extra MRP of 5% to be charged by the fertilizer manufacturing entities from farmers. It is done in order to curb diversion of urea towards industrial use, it also increases efficiency of the soil, reduces pollution as neem coated urea gets dissolved easily. Due to its multi-pronged benefits, the government is promoting neem coated urea for agricultural usage.

Nutrient based subsidy scheme: Initiated in 2010, a fixed amount of subsidy decided on an annual basis is provided on each grade of subsidized Phosphatic & Potassic fertilizers based on its nutrient content. It is being implemented by the Department of Fertilizers, under the Ministry of Chemical & Fertilizers.

Promotion of City Compost - This is going to be a game changer for our cities, as it will be converting landfill/dumpsite waste into useful by-products. This will also prevent production of harmful greenhouse gases and toxic material that pollutes groundwater and environment both. If it is implemented properly it will give better output.

Biofertilizer - it contains living microorganisms; it expands the root system and germinates better seeds. They are also known as microbial inoculants. They help in improving soil fertility and crop productivity. Rhizobium,

Azotobacter, Azospirillum are some of the best biofertilizers [Ghosh, 2003].

Organic manure - Government is promoting the use of Organic manures under the scheme *Paramparagat Krishi Vikas Yojana* (PKVY) of *National Mission for Sustainable Agriculture* (NMSA). It is doing so by providing various kinds of incentives to the beneficiaries.

Soil Health Management is also important to control usage of fertilizers. Government is trying to make available scientific tools to the farmers in order to check soil fertility, also the government is giving soil health cards after analysing the soil nutrient contents, so that only need based fertilizers are used.

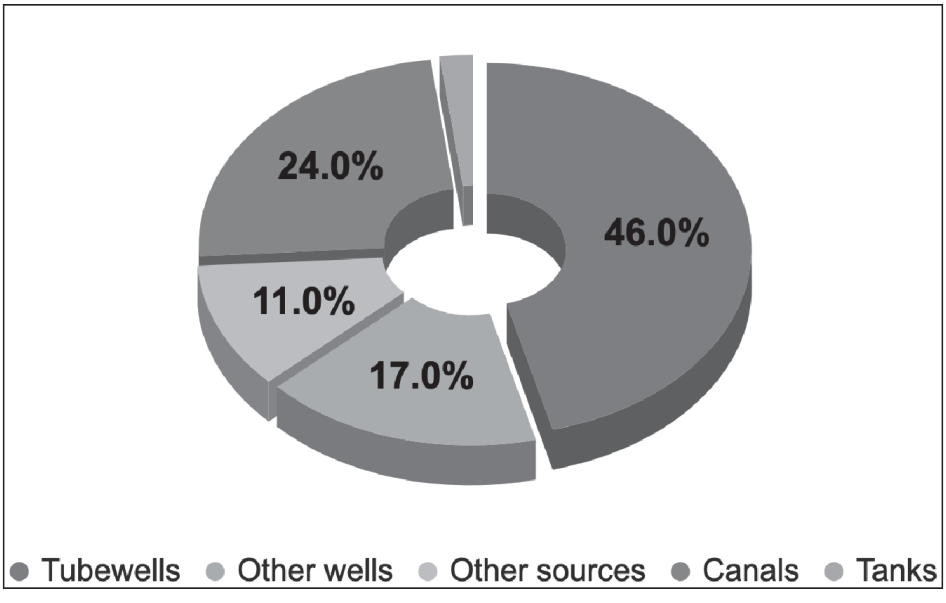
Power Subsidy

After independence the government constructed dams, canals and other water bodies through a planned process, in order to provide water to farmers for irrigation purposes. But this couldn't solve the issue of farmers, as dams and canals cater to only small farmers and in addition there were some natural barriers to it also, like India has only 4 percent of the world renewable water resources (DAC&FW), uneven distribution of rainfall in India and that's too for short period of time.

Since rainfall in India is uneven and unreliable, therefore farmers prefer to use pump sets more as it has dual benefit, it is independent from any seasonal variation, & can be used at any point of time, due to which there has been energization of pump sets in Indian Agriculture System. In our agricultural practices groundwater has been a major source for irrigation, according to a report by DAC & FW, groundwater accounts for 60% of irrigated land. There has been a sharp growth in electricity use in the agriculture sector, especially after the 1980s with consumption rising from 8% of total consumption in 1969 to 17% in 2016 (DAC&FW). Close to 85% of pumping energy used in agriculture comes from electricity, the rest being mainly from diesel. This is supplied either free or at subsidised rates, and a large part of it is not metered. This power subsidy has a dual impact; it increases the fiscal deficit of the government and limits its expenditure on other sectors, and it has a negative impact on our environment.

There is a strong linkage between electricity, water and agricultural policy. There has been a shift in cropping pattern in many regions as now farmers have almost free access to groundwater using electric tube wells. They are now able to grow more water-intensive crops. A study done by S. Chatterjee, Rohit Lamba & Esha Zaveri in M.P highlights that an increase in MSP for wheat by the government leads to more extraction of groundwater, as farmers shifted from less water intensive crops to more water intensive crop i.e., wheat [Chatterjee, Lamba, Zaveri, 2017].

Various source of irrigation in 2014-15



(Net Irrigated Area 68 Million Ha)

Source: Land use statistics (2014-15)

CONCERNS WITH POWER SUBSIDY

Overexploitation of Groundwater

Power subsidy for irrigation leads to excessive groundwater usage that is already visible in states such as Punjab & Haryana. The over-exploitation of groundwater is highest in Punjab, where 79% of groundwater reservoirs are

over-exploited, followed by Delhi (65%), Rajasthan (63%), Haryana (61%) [Department of Water Resources]. The overexploitation of groundwater, had led to a decrease in water-table. Groundwater extraction in India had increased by 18% between 1995 and 2004, and also the number of over-exploited districts - those in which annual demand exceeds annual recharge - grew by 18%. [Badiani & Jessoe, 2013]. Power subsidies had a direct relation with groundwater extraction.

Loss in Fertility of Soil

With the energization of pumps, farmers now had access to water most of the time for irrigation due to which they use it irrationally, without giving a second thought about its adverse impact. Excessive use of surface water leads to drainage problems, which in turn leads to water logging in some areas. Water logging is mainly caused due to poor maintenance of the canal and other water bodies used for irrigation.

Virtual water trade

Virtual water trade refers to the import and export of hidden water in the form of products such as crops, textiles, machinery and livestock - all which require water for their production**.** India had been losing water virtually due to its large agricultural exports, which put water availability at risk [Vidhya & Elango, 2019].

No incentive for farmers to use it efficiently

Enabling farmers to access electricity by providing power subsidies by the government, has deviated its use prone to irrationality as they are not needed to pay the electricity bills.Thus, declining its efficient usage.

Loss to electricity boards

Power subsidy had impacted the balance sheet of many DISCOMs. Since the government gives subsidies to farmers on power, DISCOMs are compelled to provide free electricity, but the government is unable to compensate DISCOMs on time, in most of the cases, which affects the performance of these companies.

Water pollution

Excessive use of fertilizers when combined with over-exploitation of water resources causes water pollution**,** which over a period of time settles with water in ground, which depletes the quality of soil available for farming.

Government initiatives to resolve the issue of power subsidy

PMKSY - (Pradhan Mantri Krishi Sichayi Yojana)

It was launched with the aim to improve the irrigation system in India, expand cultivable areas under assured irrigation, and minimize wastage of water during the irrigation process. Its motto **"more crop per drop"** is self-explanatory. It also focuses on introducing new technology in the irrigation system in order to make irrigation sustainable and enhance recharge of aquifers. It had following major components;

- *Accelerated Irrigation Benefit Program (AIBP) & Command Area Development and Water Management* - focus on faster completion of on-going irrigation projects.
- *PMKSY (Har Khet Ko Pani)* - focuses on restoration/renovation of water bodies.
- *PMKSY (Per Drop More Crop)* - focuses on micro level storage structures.
- *PMKSY (Watershed)* - focuses on ridge area treatment and many more other structures.

Drip irrigation system - In drip irrigation, water is applied near the plant root through emitters or drippers, on or below the soil surface, at a low rate varying from 2-20 litres per hour. The soil moisture is kept at an optimum level with frequent irrigation. Under PMKSY, the government is trying to increase the usage of drip irrigation methods in order to maximize benefits and minimize losses.

Micro Irrigation Fund - created by National Bank for Agriculture and Rural Development, with a corpus of ₹ 5,000 crore, implemented from 2019-2020. It aims to expand the coverage of micro irrigation facilities by providing interest subvention on loans by states.

SDGs Goals & Indian Agricultural Practices

For the sake of the economy we can't sacrifice our environment. The ambitious target of sustainable development goals by 2030, to fight against climate change, is being chased by all nations. Among the 17 measurable SDGs set by UNGA, to tackle modern global challenges by 2030, agriculture forms the nucleus of all goals directly or indirectly. SDGs aims to eradicate poverty, achieve zero hunger and many other goals, which can be achieved only when we have food security, but due to limited arable land, more and more chemicals and fertilizers are being employed, in addition groundwater is also used in an exploitative manner.

The need of the hour is to bring more innovation, and modern techniques for agricultural farming, which are sustainable. The goals of the 21st century can't be achieved with the tools of the 20th century, we can't rely only on chemicals & fertilizers to increase productivity. If we want to achieve SDGs by 2030, we need to ensure that our agricultural practices are also sustainable.

CONCLUSION

In today's scenario, mankind is facing a dilemma, on one hand there is limited arable land available for farming, but on the other hand the food requirement is rising by many folds, and in order to achieve food security, we need to increase food production. Total exclusion of fertilizer is not the solution, but excessive usage can be controlled and need to practice sustainable agricultural practices. It is important to use a scientific and systemic problem identification approach so as to understand the fertilizer and water requirement of the soil. Government is promoting the adoption of modern scientific tools which could reduce losses and maximize benefits for farmers. It is trying to make modern equipment accessible to all. There is a need to cut subsidies in order to reduce groundwater extraction, 10% reduction in average subsidy which amounts to roughly a 50% increase in price of electricity, would lead to 6.6% reduction in groundwater extraction [Badiani & Jesso, 2013]. At last but not the least, we can say that government welfare programs should be multi-perspective, it should consider all the impacts of the program, which might arise in future. Giving subsidies is not always the solution, there have been many cases in which subsidies have been diverted.

We need to cut subsidies on power and fertilizers as these have an adverse impact on human health, and it impacts the environment in a negative manner. These are acting as impediments in achieving *17 Sustainable Development Goals by 2030*, which India intends to achieve. The need of the hour is to use sustainable methods in the agricultural system. Indian farmers need to diversify their crop patterns, they need to change with change in the climate, relying on the past practices would cause misery to them.

REFERENCES

- **Economic Survey 2020-21,** Ministry of Finance, Government of India
- **Ashok Gulati and Shweta Saini** - "25 Years of Policy Tinkering in Agriculture", Rakesh Mohan (ed), India Transformed, Penguin (Viking), 2017
- **Jessica Casey** - "India's Fertilizer under Pressure", World Fertilizer, September 24, 2020
- **Katja Schumacher and Jayant Sathaye** - "India's fertilizer industry; Productivity and energy efficiency", The evolution of the US ESCO industry, From ESCO to SuperESCO, 1999
- **S. Lenka, S. Rajendira, M. V. Coumar, M.L Dotaniya and J.K Shah**, "Impact of fertilizer use on Environmental Quality", 2016
- **Chandini, R. Kumar and O. Prakash,** "Impact of chemical fertilizers on our environment and ecosystem" Research Trends in Environmental Sciences (pp.69-86) Edition: 2nd, Chapter: 5 ,2019
- **S. Chatterjee, R. Lamba, E. Zaveri**, "The water gap; environmental effects of agricultural subsidies in India", www.rohitlamba.com , 2017
- **R. Badiani, K. Jesso** ; "The impact of electricity subsidies on groundwater extraction & agricultural production", www.economics.ucdavis.edu ,2013
- **K.S Sree Vidhya, L. Elango**.; "Temporal variation in export and import of virtual water through popular crop and livestock products by India" Agris; FAO (2019)

- **N Ghosh**; "Promoting bio-fertilizer in Indian Agriculture" ; Economic and Political Weekly (2003)

DATA REFERENCES

- Annual Review of Fertilizer Production Consumption 2019-20
- Parivesh: A newsletter from Envis Centre; Central Pollution Control Board
- State of Indian Agriculture, 2017 by Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW), Ministry of Agriculture & Farmers Welfare, GoI
- mowr.gov.in ; Department of Water Resources, Ministry of Jal Shakti www.icar.org.in ; Indian Council of Agricultural Research (ICAR);
- fert.nic.in ; Department of Fertilizer, Ministry of Chemicals & Fertilizers, GoI
- **Economic Survey 2020-21,** Ministry of Finance, Government of India

STRIDES - A STUDENTS' JOURNAL OF SHRI RAM COLLEGE OF COMMERCE
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HISTORY OF THE JOURNAL

The idea to launch this Journal was discussed in December 2016 by the former Officiating Principal, **Dr. R. P. Rustagi** with **Dr. Santosh Kumari,** the Editor of the Journal. Since the idea appealed to **Dr. Santosh Kumari**, she took the initiative to contribute to SRCC by creating this new academic research Journal and took the responsibility for its Creation, Registration, License and ISSN (International Standard Serial Number) etc. along with *Editorship*. Therefore, **Dr. Santosh Kumari, Assistant Professor in the Department of Commerce, Shri Ram College of Commerce** was appointed as the Editor of the Journal vide. Office Order – SRCC/AD-158/2017 dated March 14, 2017. She meticulously worked hard in creating the concept and developing the structure of the Journal. She introduced the concept of COPE (Committee On Publication Ethics) to maintain the high academic standards of publication.

On behalf of SRCC, **Dr. Santosh Kumari** made every effort in seeking License from Deputy Commissioner of Police (Licensing), Delhi to register the Journal at "The Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India". The paper work for seeking license started under the former Officiating Principal, **Dr. R.P. Rustagi** on March 27, 2017. The foundation Issue of the Journal "**Strides – A Students' Journal of Shri Ram College of Commerce, Volume 1, Issue 1, 2016-17**" was successfully released on the 91st Annual Day of SRCC held on April 13, 2017 by **Shri Prakash Javadekar, Honb'le Union Minister of Human Resource Development, Government of India**. The title of the Journal got verified and approved by the Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India on April 21, 2017. On September 1, 2017, **Prof. Simrit Kaur** joined SRCC as Principal and signed each and every legal document required for further processing and supported **Dr. Santosh Kumari**.

On December 18, 2017, the College got the license "**License No. - DCP / LIC No. F. 2 (S / 37) Press / 2017"** to publish 'Strides – A Students' Journal of Shri Ram College of Commerce'. Due to change of Printing Press, the License got updated on March 09, 2018. On April 26, 2018, the SRCC Staff Council unanimously appointed **Dr. Santosh Kumari as the 'Editor of Strides**' for the next two academic years.

On April 27, 2018 (The Foundation Day of the College), **Dr. Santosh Kumari** submitted the application for the registration of the Journal. On May 04, 2018, the SRCC received the '**Certificate of Registration**' for **"*Strides – A Students' Journal of Shri Ram College of Commerce*"** and got the **Registration No. DELENG/2018/75093** dated May 04, 2018. ***On behalf of Shri Ram College of Commerce, it was a moment of pride for Dr. Santosh Kumari to receive the 'Certificate of Registration' on May 04, 2018 at the Office of Registrar of Newspapers for India, Ministry of Information and Broadcasting, Government of India (website - www.rni.nic.in).***

On May 07, 2018, **Dr. Santosh Kumari** submitted the application for seeking ISSN (International Standard Serial Number) at "ISSN National Centre – India, National Science Library, NISCAIR (National Institute of Science Communication and Information Resources). Weblink - http://nsl.niscair.res.in/ISSNPROCESS/issn.jsp". Finally, the College received the International Standard Serial Number "**ISSN 2581-4931 (Print)**" **on June 01, 2018.**

We are proud that this journal is an add-on to the enriched catalogue of SRCC's publications and academic literature.

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