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The Economic and Technical Factors During Coronavirus Pandemic in affected countries

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Abstract—The pandemic coronavirus (COVID-19) which spreads through contact with an infected person has already brought a significant change in the world's economy and human misery. It has made everything so uncertain globally. The crude oil war between two biggest exporters Saudi Arabia and Russia has also added fuel to fire. All big investment decisions are on a halt due to this uncertain situation around the globe. Not only the finance sectors are suffering but human life is at great risk which proves health is more important than wealth. However, biodiversity is blooming which can help people realize how important mother nature is for all of us which may result in new sustainable development ideas. In this crucial situation, India is a developing country, and has a very big opportunity at its doors to finally take the ultimate Make in India strategy at work. If this strategy is handled nicely during this time it would help to create more jobs for the people of the country for now and for the future as well which will make it easier to recover from this pandemic. This pandemic can be a big lesson in the country about how much they are dependent on China and other countries. Many countries who earlier were dependent on China for various goods are now searching for other sources and India can take advantage of this moment very well if it takes actions accordingly. Technology has also played a crucial rule. Machine Learning models are used to track and efficiently deal with the spread of the virus.

Keywords—*Coronavirus, Machine Learning, Trade, Stock Market.*

I. INTRODUCTION

There will be a significant impact of COVID-19 on the global demographics. The fourth quarter of FY 2019-20 saw one of the biggest global equity collapses after the Great Depression. The first quarter of the current financial year shall follow with increased disturbances as the virus is spreading rapidly to a large part of the globe and the months ahead shall be volatile. The US labor market has reached half-century lows. Around 26 million people have lost their jobs. Many cities are under lockdown which has led to the closing of businesses and increased staff layoffs. No relief is expected in the near future. The European Central Bank has massively expanded purchase of its assets. This crisis may shrink the euro economy by 9% (estimated by Goldman Sachs). The oil price has tumbled significantly. According to the IMF, Asian economies would see no growth this year with an exception to 1.2% growth in China and 1.9% growth in India. The service

sector shall remain under immense pressure. Chinese economy has contracted in the first quarter and it is expected to be further hit due to the reduced demands and disrupted supply chains around the world. Companies like Nissan and Hyundai had to shut down factories outside China due to shortage of products and parts from China. The governments have been trying to manage the fallout. The UK and Danish governments have announced plans to pay wages to employees across the country. The UK shall pay up to 80% of the wages whereas Danish government shall cover 75% of employees' salary. The US Federal Reserve has almost cut its interest rates to 0. The new normal in social behavior (i.e. Social distancing), PPEs, healthcare surge capacity and testing & tracing have been imposed judiciously. Many countries have imposed bans on travel including air travel. It has been estimated that the airlines could have to suffer a loss up to \$113 billion in revenue. There is a risk of drug shortage as India is still on lockdown and it supplies nearly half of generic drugs to the United States.

II. LITERATURE REVIEW

The world is witnessing a complete ban on social and economic activities. Travel quarantine has been imposed. Countries have adopted two policies to counter- imposing lockdown and secondly, widespread testing and tracking and no lockdown. The tracking activities have been initiated very promptly. Post-pandemic economic and political policies shall be drawn based on the lessons and hardships ensued in its wake. The debate shall remain focused around the post-coronavirus value creation for the civic society. [1] The results show GDP growth will take a hit ranging from 3-5% depending on the country, in a mild scenario. Every extra month of shutdown accounts for approx. 2-2.5% of global GDP growth. If the worldwide spread of COVID-19 is mild and contained, global growth can take a hit by 0.5%. Growth can supposedly be negative in the first quarter of 2020. The confidence of consumers and investors has been low and the supply chains have been disrupted. China has a key and rising role in supply chains globally. The countries which are strongly connected to China will face consequences.

The private and state sector testing capabilities need to be ramped up. Supportive policies by the government can help to restore confidence and help demand of commodities recover but will

not be able to avoid immediate disruptions resulting from lockdowns and restrictions on travel, export, etc. [2] The Coronavirus outbreak of 2019-20 has left governments, markets, and civil society reeling through disruptions and damage that shall heal at different intervals and to differing degrees around the world.

The stock market in the U.S. has been dropping constantly and it is now considered an epicenter.

About 38% people who were surveyed knew that the Federal Reserve had cut the rate of interest. All the predictions on growth prospects are based on the fact that governments consider domestic policy easing. [3] Most consumers were somewhat or very concerned about effects of coronavirus on the U.S. economy, their health, and their personal finances; 28% had cancelled or postponed travel and 40% purchased food or supplies in response to these concerns.

Some sectors have seen a rise in the number of jobs. [4] In theory, heightened uncertainty can raise unemployment because a job match represents a long-term employment relationship and hiring decisions are costly to reverse. Measures should also be taken to protect vulnerable communities. They should be provided direct cash transfers, unemployment insurance or short-time working schemes. [5] Aggressive policies to support investment can reverse the supply-demand doom loop and jumpstart the economy out of stagnation traps. [6] Whether economies can avoid the recession or not, the path back to growth under Covid-19 will depend on a range of drivers, such as the degree to which demand will be delayed or foregone, whether the shock is truly a spike or lasts, or whether there is structural damage, among other factors.

III. RESULTS

The real economy has come down to a halt due to total shutdown in most parts of the world. This wasn't the case in 2008. The year 2008 was only due to financial reasons whereas now the world is facing an epidemic. Projections from the IMF and the World Bank are expecting a major downturn. The return of industries to full operations is not feasible in the short term. In India, the cases have been rising rapidly. The predictions for positive cases, recoveries and deaths have been made using a machine learning model. The data can be explored using various projections in Figure 1. The model has used a support vector machine, Bayesian ridge and linear regression.

3.1. Factors leading to global recession:

3.1.1. Consumer Confidence: The consumer confidence has been low since the outbreak. It is psychological and means that the user is less likely to spend money and get defensive.

3.1.2. Stock Market Crash: The market has been volatile as a response to COVID-19. A number of attempts are being made to prevent panic-trading. Huge drops have been witnessed due

to uncertainty around global coronavirus pandemic. Figure 1 shows the drop in index from 7th of January to 2nd of April.

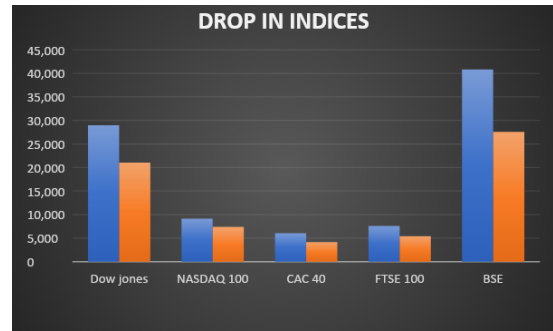


Figure 1. Drop in various indices.

3.1.3. Slowdown in manufacturing orders: The pandemic has resulted in lockdowns bringing factories to closure and manufacturing to a halt. The manufacturers will have to rely more upon automation and digitalization for long term operation as they've stepped up to keep their employees safe from the virus.

3.1.4. Employment: The factories and industries have been shut down due to COVID-19 and people have lost jobs due to this reason. However, there is a speculation that the jobs in the technology sector will see a rise considering the boost in the digital economy. There will also be a risk that people shall lose high salaried jobs as the companies would justify their costs and the focus will shift on hiring freelancers. Salaries shall be unfixed and companies may also consider a clause for sudden cuts. COVID-19 will create a number of jobs in the healthcare sector. Along with unemployment, underemployment will also rise steeply. There have been measures to control the loss of jobs through contactless deliveries or take-out orders, some do not have this liberty. Sports arenas and movie theatres had to shut down due to government mandates on social distancing. The air transportation has suffered due to travel restrictions. Table (1) shows the Sectors with increase and decrease of jobs.

Table 1. Sectors with increase and decrease in jobs.

Sector with increase in jobs	Sector with decrease in jobs
Technology	Service
Healthcare	Retail Trade
Pharmaceutical	Transportation
Supermarket Chains	Tourism

3.1.5. Interest Rates: There has been a significant cut in the interest rates across a number of countries such as Turkey, China, Malaysia, Canada, Australia, US, New-Zealand, UK, etc. It is being done to encourage people to buy more things and consider their options to take out loans. The European Central Bank has announced a €750 billion bond-buying program whereas the Reserve Bank of India has cut the repo

rate by 75 basis points and 90 bps, respectively. This rate cut shall also negatively impact the FD investors, especially the senior citizens who depend on the interest incomes.

3.1.6. Response from Tech Sector: 3D printing manufacturers (such as HP, Johnson and Johnson) have taken steps to address equipment shortages by manufacturing 3D products to meet global needs. Telenor is working to contain the spread by harnessing mobility data. It provides accurate data of how people have travelled so the authorities have the accurate information which would prove beneficial to contain the spread. Sanitization is a key to prevent the spread of coronavirus. Global brewers (like AB InBev) are turning alcohol into hygiene products.

3.2. Uses Of AI:

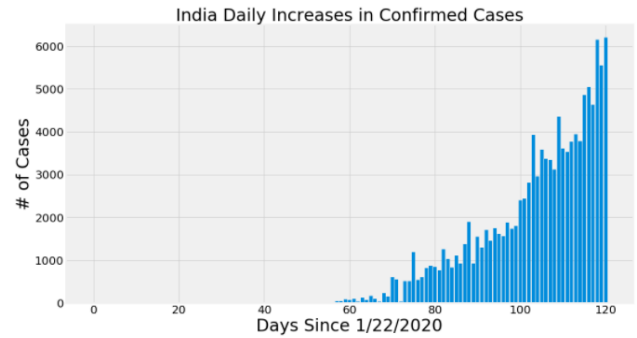
3.2.1. Accelerating treatment research: Descriptive analytics play an important role here. Labelled data is processed to find a pattern. AI in the past has been used to analyze diseases including cancers through image analysis. There has been an attempt to develop an open sourced COVIDx dataset which shall be built by researchers and data scientists. The initial model has been trained by 5000 X-rays. Deep learning along with image analysis might prove helpful in accelerating the quest to find a cure. Another AI cloud-based software provides an early diagnosis using radiologist matching and a huge image database.

3.2.2. Managing Businesses- Since the physical presence of employees in offices have been limited, companies like YouTube, Instagram, Facebook, etc. rely heavily on artificial intelligence. YouTube uses AI to moderate videos during the pandemic. This means that videos which would be flagged for violating the company policy shall be removed permanently. Facebook/Instagram uses AI to monitor posts and comments. These removals usually go through a human review but due to the prevailing circumstances, some errors and mistakes are heavily expected. The process to review these removals shall also be delayed.

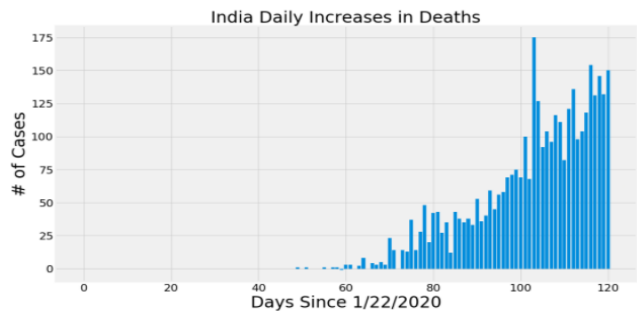
3.2.3. Finding Danger zones- AI assesses a bunch of information such as demographics and personal data. This personal data includes place of residence, travel history and their recent contact with any individual known to have Coronavirus. This helps to provide a risk assessment which can be classified into three categories- low, moderate or high risk. Further, it could notify authorities for a fast-track check-up. This also helps to get an idea about how the virus is spreading in a particular area.

3.2.4. Tracking Movements: In India, L&T uses machine-learning based systems for the recognition of number plates to help the police force enforce the curfew. There also has been

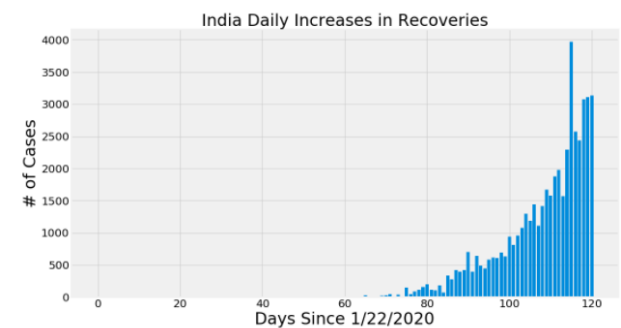
development in fever detection using thermal cameras at public places and drone based surveillance for monitoring crowd formations. 3.2.5. SHORTFALLS OF AI: Machine learning which is the current form of data needs a number of relevant training data (as it identifies patterns through incidents of the past). AI assumes that the solutions that have been used in the past can be used to tackle such situations in the future. A situation like COVID-19 pandemic is unprecedented. Secondly, humans can learn from one particular instance but an algorithm shall have to start from scratch even for the slightest change in settings. One way to move forward is to gather new training data under current conditions.



2.(a)



2.(b)

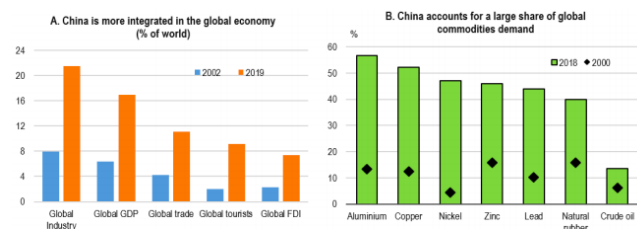


2.(c)

Figure.2 Projections of total number of positive cases, deaths and recoveries in India from 22nd January 2020. 2.(a) Describes daily increase in the number of positive cases. 2.(b) Describes daily increase in number of deaths. 2.(c) Describes daily increase in recoveries.

IV. CONCLUSION

Government is expected to act swiftly to overcome the economic impact due to the spread of coronavirus. It is important to take forceful measures to contain the spread and ensure well-implemented policies to support the healthcare sector (systems, workers and equipment). There shall be unplanned delays throughout the world in restarting businesses due to travel and labor mobility restrictions. China plays an important role in the global economy. [7] The rapid spread of the Corona virus in China has stopped the normal life of the people in China. This fear has impacted the tourism industry of the country domestically and internationally. An economic setback in China will have adverse effects on other economies in the world. The projections about their economy can be seen in Figure.3.



Note: Share of industry, GDP and trade in constant US dollars. Share of global FDI in current US dollars. Data for the tourist share refer to 2002 and 2017, and data for FDI refer to 2005 and 2018. Industry data are on a value-added basis and include the construction sector. Source: OECD Economic Outlook database; OECD FDI in Figures, October 2019, and World Bank.

Figure 3. Impact on Chinese economy.

The attempts to stop the pandemic shall cause severe damage to social and economic networks across the globe. There will be large scale sufferings in medium and long term. [8] In this unexpected event, it is important for the customers and businesses to make right decisions at the right time. If the virus is contained but does strong sector damage then there will be lower long-term growth trend. If the virus is contained, there shall be a slow and steady recovery. On the other hand, if the public-health system fails to control the spread and no vaccines are available there shall be widespread bankruptcies and credit defaults. It would lead to a potential banking crisis. Although, strong policies may be able to prevent structural damage and could lead to recovery to the pre-crisis fundamentals and momentum. Countries have come up with unprecedented levels of fiscal and monetary stimulus to limit the economic impact of crisis thereby saving livelihoods. Huge uncertainty remains on what steps to take in coming months. In time, scientific advancements can also impact this dynamic assuming effective vaccine, new treatments and testing is deployed and available at a large scale.

V. FUTURE WORK

Countries need to take drastic measures. Regional cooperation is important to strategically handle this common problem. Nations will have to take drastic measures as joint action to save themselves from the effects of COVID-19-driven pandemic as discussed in this paper. Companies in the private sector may take steps for the redeployment of their employees to save them from losing their jobs (Ground staff at baggage check-in can be trained to load cargo in aircrafts). This can be done through training and capacity building. People can be trained through online mode with courses designed to meet the requirements of the companies. This pandemic has highlighted the fact that many jobs are not essential but there exists a shortage of key workers in this time of need. Growth may eventually happen if aggregate demand and production rise. [9] Efforts to contain and mitigate the spread of the virus in order to reduce the loss of human lives have ultimate priority. Nevertheless, policymakers need to act quickly to address the mounting negative economic fallout from this crisis. [10] Greater concern is associated with higher inflation expectations and more pessimistic unemployment expectations.

It has also been noticed in countries like South Korea and Taiwan that rapid testing and targeted solutions can be extremely effective to control the devastating effects. Governments need to spread awareness amongst the masses about the new social and behavioral norms like social distancing, wearing masks, maintaining hygiene, etc. Value chains might break globally and this would present an opportunity for developing countries (like India) to replace too much reliance on China for imports and leapfrog its export. Countries would need to carry out operations to bring distressed people back to their homes. Diplomacy and dialogue would play an important role in doing so. Nationalization of modes of transports, hospitals and large businesses which seemed impossible to achieve before the pandemic is possible now. If deep recession happens and normalcy in supply chains does not occur, the state may even have to take over production. These lockdowns can also help us in effectively tackling climate change. Pollution index has significantly gone down in many metropolitan cities. [11] The coronavirus crisis showed that the world is so fragile and non-resilient, but also the world is full of hidden potentials and undiscovered opportunities. It gives us time to rethink the business models we adopted in our life.

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