

Impact on Earnings and Expenditure of Indian Households during Lockdown due to the outbreak of COVID-19.

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ABSTRACT

COVID-19 is an entirely new pandemic and the resulting precautions taken to limit its spread have never been experienced to the level it is been followed at present. Lockdown is one such precaution taken by the government to limit the movement of people thereby limiting the spread of the disease. Therefore, the production lines at the industries were halted, schools and educational institutions remained close. This caused fear among the population and they started stocking up things of necessity. Through this paper, we have tried to formulate a regression model to find out which type of job has the most effect on the earnings of the households and households shifted or reduced expenditure on which items during the lockdown. The data collection is done through a survey and a total of 456 respondents' data was analyzed. It was found that private job, government job, and business each has impacted the earnings of the household during the lockdown. Major items which saw a reduction in expenditure are the petrol/fuel/traveling expense, online food ordering, school/college fee and online shopping whereas items such as internet/wifi, online entertainment subscriptions, LPG/kitchen fuel, medical goods saw an increase in expenditure.

Keywords

Expenditure, job, household, COVID-19, Regression, Effect, Earning, social distancing, income

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Introduction

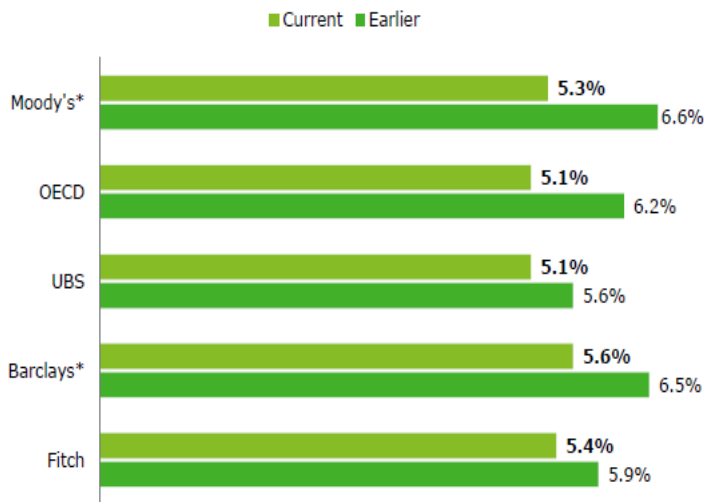
Humans and human societies are always been plagued by disease pandemics from the earliest days of recorded history. Once such pandemic is COVID-19 which started spreading its infectious wings beginning from a district in Wuhan, china around December 2019. Within a small period of 3-4 months, cases of people infected by coronavirus started reporting from most of the countries in the world. The countries with the greatest economies such as the United States of America, India, the UK, Russia, Spain, Germany, etc couldn't escape from the brunt of this deadly virus. The signs of this disease are fever, dry cough, exhaustion, aches and pains, nasal congestion, etc. This virus has been found spreading through coming into contact with a person infected with a virus when he sneezes, coughs or speaks, small droplets from the nose or mouth are expelled, and coming into their contact spreads it to the other person. Therefore it was made compulsorily for everyone to wear gears such as masks, gloves, etc and wash their hands with soap or use a hand sanitizer every time they touch or come in contact with anything which could have virus particles attached to it. The number of infected cases from the virus rose drastically to around 49lacs and still increasing all over the world with deaths of around 3.2lac people. This dangerous situation created panic worldwide and governments of various countries initiated a lockdown with several deadlines to cease the spread of the virus among the people.

India reported a total number of 88 infected cases with just 1 death till 22nd March 2020. The Indian government took a serious step to initiate a lockdown in the whole country on 22nd march, 2020 to control the situation at the earliest without getting it out of its control and instructed all the private and government offices to shut down their

operations and instructed all employees to get back to their homes; all schools, colleges and other educational institutions were instructed to remain closed; public transport services such as buses, railways, metro trains, domestic and international flights have been terminated for the time the lockdown stays. Only shops relating to necessary utilities such as groceries, milk booths, medical stores, Kirana stores, etc were instructed to remain open that too with strict guidelines. Everyone who goes out of the house is instructed to cover their face with a mask and maintain a social distance with others to avoid any contact. The lockdown which was initiated to stay till 15th April 2020, got further extended by three times and remained till 30th May 2020. As a result of this lockdown, businesses stumbled and production halted. India saw about two-thirds of production loss wiping around Rs 8 lakh crore. The worst-hit sectors are tourism, hospitality, and aviation. Hotels saw thousands of bookings getting canceled resulting in losses. A report from the ministry of civil aviation stated that nearly 585 international flights have been canceled to-and-from India between 1st Feb to 6 March 2020 resulting in the lowering of cash reserves of airline companies faced with a fear of bankruptcy and leading to loss of jobs for many. With the cancellation of flights, both inbound and outbound tourism showed a decline of 67% and 52% respectively from Jan to Feb as compared to the same period last year. As per the Indian Association of Tour operators (IATO), combined hotel, aviation, and tourism incurred a loss of around 8500 crores due to travel restrictions. China has always remained a major market for many Indian products like petrochemicals, gems, jewelry, automotive products, and spares, etc but due to the outbreak of coronavirus, India has imposed trade restrictions on china resulting in a loss of around 8000-10000 crores.

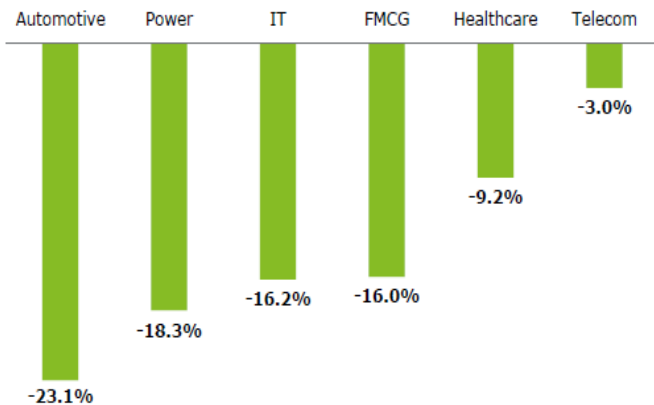
As per Fitch’s rating, India’s economic growth was estimated to 5.4% for 2020-21 from 5.9% estimated earlier. The bar chart below shows changes in India's economic growth projections for 2020-2021 due to coronavirus outbreak by several institutions.

FY21 growth projections for India

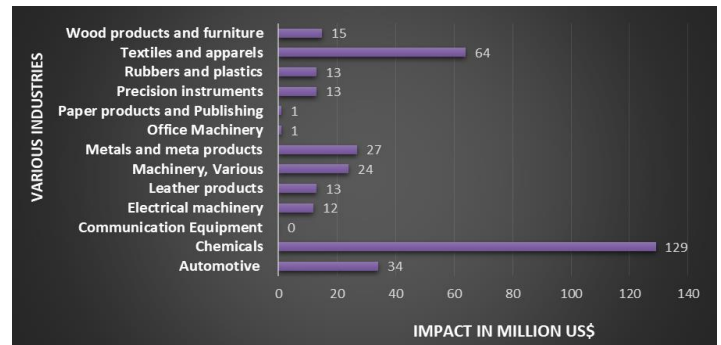


The Bar chart below represents the growth in various Indian markets impacted by the pandemic taking India towards an economic slowdown.

Impact on markets



As China is a major trade partner of India, Slowdown in china’s economy has impacted various industries in India. It is estimated that a 2% reduction in Chinese exports of intermediate goods and slowdown in Chinese production will cause a loss of around US\$350 million for various industries in India.



As the spread of virus increased in India combined with the lockdown during March 2020, Indian households experienced drastic changes w.r.t many aspects in their lives. Because of the government's closure of business offices and restricted trips outside homes, Indians started to work out in response to confusion about how the future will turn out by adjusting how and where they would spend money on. Politicians have worked to reduce the economic risk to families and small enterprises through all levels of government and a wide variety of agencies. Yet the pace at which the economic shock occurs has made it difficult to formulate policy for properly targeting household fiscal stimulus and provide provision for credit. In the end, nothing is understood about how households address a pandemic on a statistical basis and in their spending through a larger number of families and geographies.

During this situation, it will permit for a high-speed, complex, and prompt analysis of how households changed their pattern of expenditure when they started responding, and which are the attributes of the households that reacted more quickly.

News media claimed that in an attempt to stock-pile consumer products, consumers cleared supermarket shelves. Accordingly, it was discovered that the pattern of spending among the households changed substantially as the information spread about the effect of the COVID-19 on their region. As a whole, expenditure rose significantly to store required domestic products and also in expectation of retailers being unable to promote. People stayed at home because of the spread of the virus, in mid to late March we saw a deep drop in restaurants, shopping, air travel, and public transport. Restaurant spending decreased.

This is the first paper to examine how household spending responds in a pandemic, where both expected earnings shocks and the possibility of supply chain instability are present, but both coupled with considerable uncertainty. In India, in early March there was less effect of COVID-19 but considerable knowledge of possible future impact. We see strong accumulating and outgoings responses, which is stable with assumptions that play a major part in decisions regarding household consumption.

Review of Literature

Consumer Responses to the COVID-19 Crisis: Evidence from Bank Account Transaction Data

Asger Lau Andersen, Emil Toft Hansen, Niels Johannesen, Adam Sheridan

This paper studies and analysis the transaction-level data from one of Denmark 's biggest retail banks to research the consequences of COVID-19 in Denmark on consumer expenses. The paper found that the shutdown of seven days led to a decrease in the average spending which was 27 percent below the counterfactual level without the pandemic. It was also found that the decrease in spending is greater for those customers who have been primarily impacted by the pandemic in the form of work loss, wealth destruction, extreme illness, interrupted patterns of consumption, and crisis-related unemployment.

The Global Macroeconomic Impacts of COVID-19: Seven Scenarios

Warwick McKibbin and Roshen Fernando

This paper discussed the challenges faced by policymakers in formulating macroeconomic policy due to the COVID-19 outbreak. To this end, this paper discusses 7 different circumstances on how COVID-19 could grow over the years to come using a modeling approach developed by Lee and McKibbin (2003) and expanded by McKibbin and Sidorenko (2006). This discusses the impact of different scenarios on macroeconomic results and financial markets in a global hybrid DSGE/CGE general equilibrium model.

Financial Crises and Social Spending: The Impact of the 2008-2009 Crisis

Maureen Lewis and Marijn Verhoeven

This paper analyzes experiences for 131 countries from 1995-2007; fiscal social spending programs to 2013; and discusses common issues related to finance social spending in the ongoing downturn, including donor reactions, and frameworks for dealing with government and households.

Covid-19 Pandemic Versus Global Financial Crisis: Evidence From Currency Market

Dr. Samet Gunay

The current downturn in the foreign exchange markets was examined in this analysis by matching it with the volatility witnessed during the 2008–2009 global financial crisis. In the present investigation, we use a variety of tests: Kapetanios m-break unit root search, downside variance, upside risk, skewness of volatility, Gaussian VaR, historical VaR, and VaR. The disorder in exchange markets is not as bad as the global financial crisis, according to most methodological findings. However, the skewing volatility shows a different image that parallels media pessimism.

How Does Household Spending Respond To An Epidemic? Consumption During The 2020 Covid-19 Pandemic

Scott R. Baker, R.A. Farrokhnia, Steffen Meyer, Michaela Pagel, Constantine Yannelis

In this paper, household financial transaction data was used to analyze the effect of the COVID-19 virus on household consumption in the United States. With the number of cases increasing, households have started changing their traditional expenditure dramatically in many major

categories. Initially, the costs, particularly for the retail, credit card, and food products, increased sharply. Despite this, overall spending declined significantly. By 29 March in states where shelter orders were in force, households reacted more strongly. Greater social distance is correlated, in particular in restaurants and retail, with declines in spending.

How Are Small Businesses Adjusting To Covid-19? Early Evidence From A Survey

Alexander W. Bartik, Marianne Bertrand, Zoë B. Cullen, Edward L. Glaeser, Michael Luca, Christopher T. Stanton

To perform this study, a survey on over 5,800 small businesses was conducted. The findings give rise to many key themes. Firstly, there have already been mass dismissals and closures. In our sample, 43% of companies are temporarily shut down and companies have reduced their number of employees by 40 percent on average as compared to January. Second, we find many small companies financially vulnerable, in line with previous literature. The median business, for example, has more than 10,000 dollars in monthly costs cash for less than one month. Third, every enterprise has different views regarding the likely period of COVID-related issues. Fourthly, several organizations intend to receive grants under CARES. Nonetheless, other expected access issues, such as bureaucracy and eligibility issues.

Research Gap

COVID-19 is a worldwide pandemic and a recent outbreak, due to which various studies are in process to study its impact on various sectors, different countries, different age groups, etc. So through my research, I want to cover one such impact of COVID-19 and lockdown on Indian households on their jobs, incomes, and expenditure patterns.

Objectives of the study

Due to the outbreak of COVID-19 worldwide, the lockdown has been initiated by the governments of different countries given the protection of their people from getting affected by the virus.

As a result, the government gave strict orders to businesses to shut down their offices, employees were told to remain at home until the next government orders, public transport was halted, shops of groceries, Kirana stores, medical stores, and other utilities were opened following strict guidelines.

The focus of the study is to find out how the earnings and expenditure of Indian households got impacted during the lockdown.

For which, working members in a family employed in private or government jobs, as well as those running their businesses, were asked certain questions to study the impact on their earnings due to lockdown and how they are coping or prioritizing their expenditure on various household things or items, from which items households have to shift/reduce their monthly expense from and what are factors responsible for the shift to other items.

Hypothesis

For Model-1:

Ho= Null Hypothesis= Effect on earning is equally dependent on all the independent variables i.e. earnings from a private job, earnings from a government job, and earning from the business.

Ha= Alternate Hypothesis= There is a relation of independent variables on the effect on earning (dependent variable) with each variable having a different effect.

For Model-2:

Ho= Null Hypothesis= Effect on expenditure is equally dependent on all the independent variables i.e. expenditure on petrol/fuel/traveling, school/college fee, house/office rent, EMI, online food ordering, online shopping, medical goods, online entertainment subscriptions, internet/wifi, kitchen fuel/LPG, and mobile recharge.

Ha= Alternate Hypothesis= There is a relation of independent variables on the effect on expenditure (dependent variable) with each variable having a different effect.

Research Methodology

1. Dataset: To collect the relevant data for carrying out the research study a questionnaire was floated with several questions on various variables. The total responses received are 456 ranging from various states across India. The questionnaire has two parts. The first part of the questionnaire collected data about the family income and expenditure monthly, family structure, nature of the job of working professionals in the family, state/UT the family resides in, expenditure on a list of items on which an Indian household generally spends during a month such as groceries, electricity and water bills, LPG or kitchen fuel, traveling expenses, etc. All this information in the first part of the questionnaire is based on before the lockdown or outbreak of COVID-19.

The second part of the questionnaire asked respondents to fill information considering the ongoing lockdown scenario where they were asked questions on how the jobs or businesses got affected of the working professionals, for the same list of household items they were asked to give a rating whether they increased, decreased, stopped or kept the same expenditure as before, etc.

2. Multiple logistic regression model in R studio

Two models have been chosen to study separately the effect on earnings and effect on expenditure from model-1 and model-2 respectively, which will tell two things, firstly, whether the earnings and expenditure of the households saw an increase or decrease during the lockdown and secondly it will tell working member employed in what type of job has been most affected, and expenditure on which households items resulted in an increase or decrease.

- **Model-1:** The purpose of which is to study the effect on earnings of the households due to the changes in employment of working members associated with a private job, government job, and running their own business during the lockdown.

In this model, we have taken “effect on earnings” during the lockdown as the dependent variable (y), which is a factor

variable with two levels as “0” equal “decrease in earnings” and “1” equals “increase in earnings” whereas the effect on private job, government jobs and businesses of respondents have been taken as the independent variables(x). The respondents were asked to rank their status of earnings in private, government, or business in the following manner:

Status	Rank
Not Applicable	0
Sacked/Lay off/Complete Shutdown of business	1
Working but not getting paid/Not able to operate the business due to lockdown	2
The decrease in salary/earnings	3
Getting paid normal	4
Increase in salary/earnings	5

- **Model-2:** The purpose of which is to study the effect on the expenditure of the households due to the change in expenditure on various household items such as internet/wifi, petrol/fuel, LPG/kitchen fuel, etc during the lockdown.

In this model, we have taken “effect on expenditure” during the lockdown as the dependent variable (y), which is a factor variable with two levels as “0” equals “decrease in expenditure” and “1” equals “increase in expenditure” whereas expenditure on various items such as Petrol/Fuel/Travelling, Internet/Wi-Fi, Medical goods, Rent, EMI, etc are taken as the dependent variables(x) to study which items contributed most to the total expenditure and how is their effect on the total expenditure. The respondents were asked to rank their status of expenditure on these various items in the following manner:

Status	Rank
Stopped Spending	0
Decrease in Spending	1
Same Spending as before	2
Increase in Spending	3

Data Analysis and Model Output

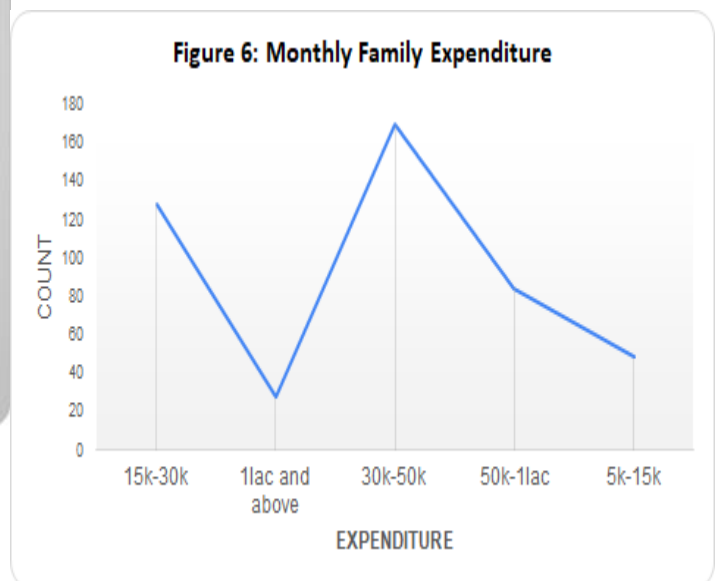
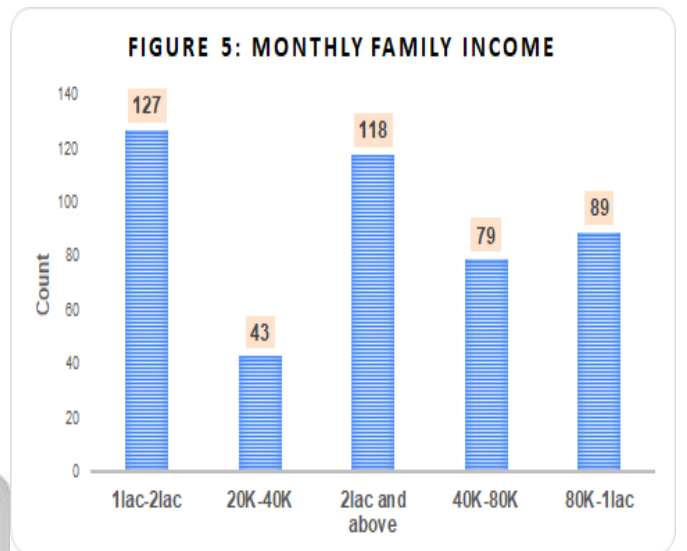
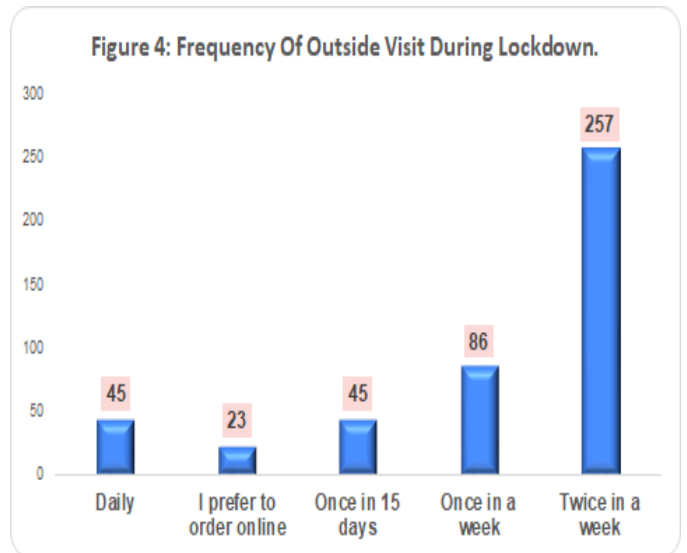
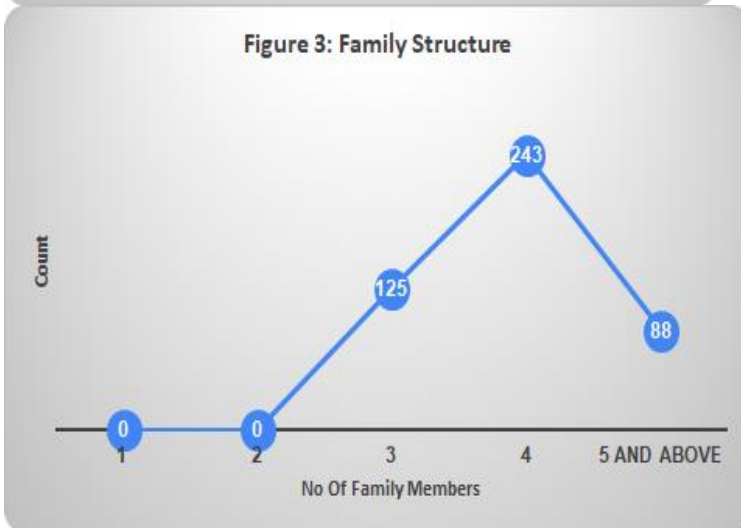
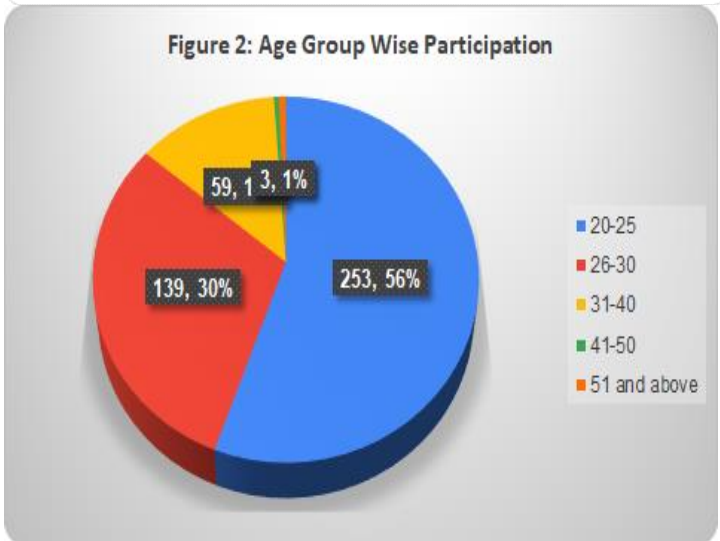
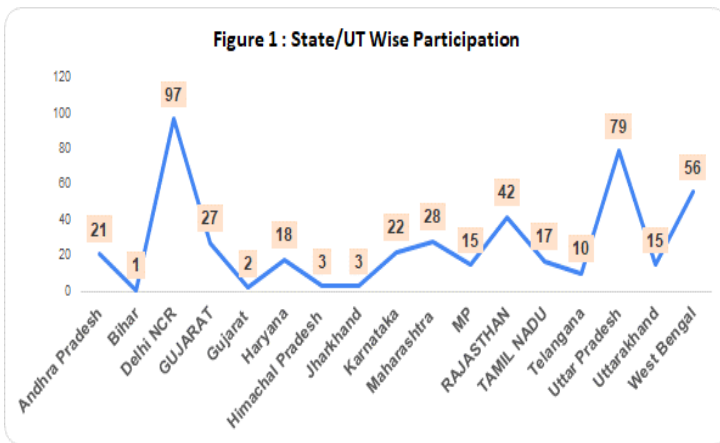


Figure 7: Impact On Compensation During COVID-19

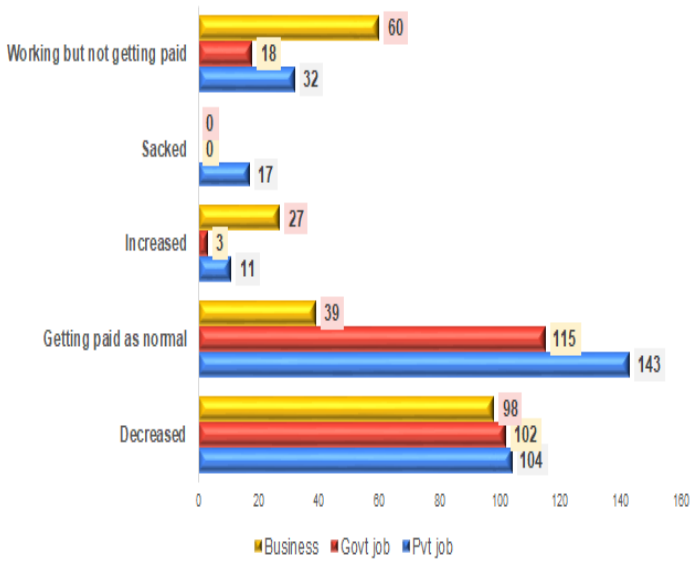


Figure 10: Impact On Various Household Expenditures

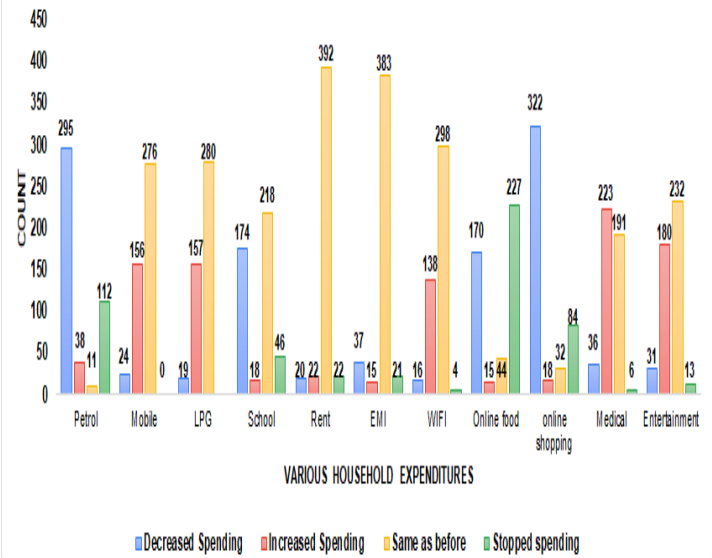
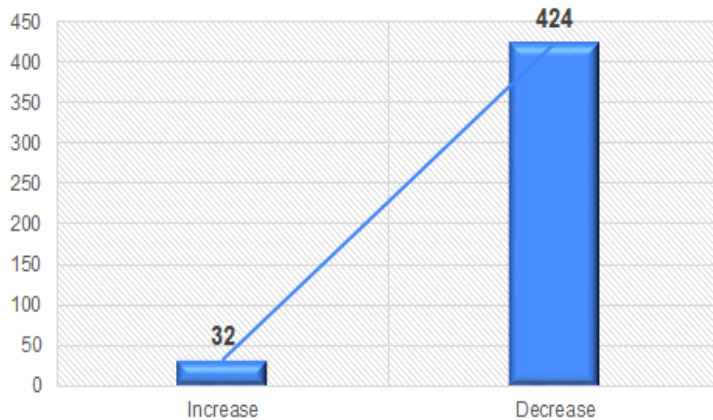


Figure 8: Effect on Earnings



Call: `glm(formula = Affect_Earning ~ Pvt_job + Govt_job + Business, family = binomial(link = "logit"), data = training)`

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.8071	-0.3293	-0.1040	-0.0364	3.7703

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-6.3278	0.9748	-6.492	8.49e-11 ***
Pvt_job	0.3705	0.1698	2.182	0.0291 *
Govt_job	-0.5263	0.1823	-2.886	0.0039 **
Business	1.2507	0.2239	5.587	2.31e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

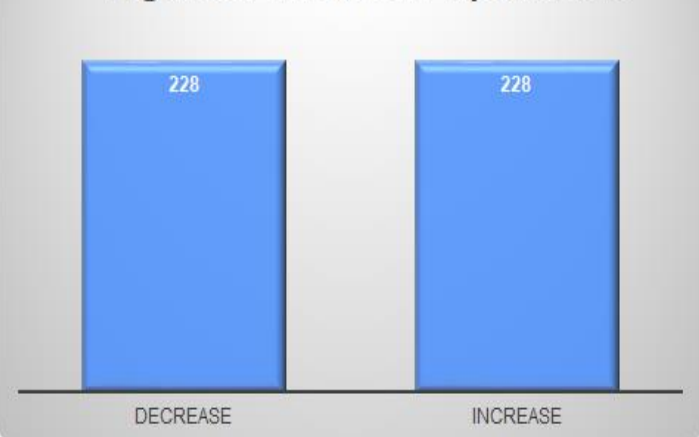
Null deviance: 187.33 on 363 degrees of freedom
 Residual deviance: 113.74 on 360 degrees of freedom
 AIC: 121.74

Number of Fisher Scoring iterations: 7

```
> misclassificError
[1] 0.1304348
> print(paste("accuracy",1-misclassificError))
[1] "accuracy 0.869565217391304"
```

Figure 12

Figure 9: Effect on Expenditure



Call: **Figure 13: Output for Model-2**
`glm(formula = affect_expenditure ~ ., family = binomial(link = "logit"),
 data = training)`

Deviance Residuals:
 Min 1Q Median 3Q Max
 -1.5570 -0.7582 -0.0090 0.5395 4.1418

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-18.90039	2.47590	-7.634	2.28e-14 ***
fuel	0.30717	0.28034	1.096	0.273201
mobile	0.82234	0.43263	1.901	0.057332 .
kitchen_fuel	1.23104	0.35534	3.464	0.000531 ***
schl_col_fee	0.82748	0.25913	3.193	0.001406 **
rent	-0.13004	0.35853	-0.363	0.716837
EMI	-0.03695	0.38729	-0.095	0.923998
int_wifi	3.14303	0.58276	5.393	6.92e-08 ***
foor_order	-0.16219	0.27007	-0.601	0.548145
shopping	0.29270	0.30390	0.963	0.335482
medical	1.46289	0.32466	4.506	6.61e-06 ***
entertainment	1.11653	0.29477	3.788	0.000152 ***

 Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 504.60 on 363 degrees of freedom
 Residual deviance: 292.16 on 352 degrees of freedom
 AIC: 316.16

Number of Fisher Scoring iterations: 6 **Figure 14**

`> misclassificError` **Figure 15**
`[1] 0.1304348`
`> print(paste("accuracy",1-misclassificError))`
`[1] "accuracy 0.869565217391304"`

Confusion Matrix and Statistics **Figure 16**

		prediction	
		0	1
0	0	36	9
	1	3	44

Accuracy : 0.8696
 95% CI : (0.7832, 0.9307)
 No Information Rate : 0.5761
 P-Value [Acc > NIR] : 1.05e-09
 Kappa : 0.7383
 McNemar's Test P-Value : 0.1489
 Sensitivity : 0.9231
 Specificity : 0.8302
 Pos Pred Value : 0.8000
 Neg Pred Value : 0.9362
 Prevalence : 0.4239
 Detection Rate : 0.3913
 Detection Prevalence : 0.4891
 Balanced Accuracy : 0.8766
 'Positive' Class : 0

Findings

- 1) The Survey questionnaire to study the changes in expenditure patterns of Indian households has been filled by a total of 456 respondents belonging to 17 states and UT of India. The maximum responses received are from Delhi NCR and Uttar Pradesh. (**Figure 1**)
- 2) On segregating the respondents into various age categories, it was found that 56% of respondents belong to the age category between 20-25 years, and 30% between 31-40 years. (**Figure 2**)
- 3) The number of family members' counts for every respondent is a minimum of three. 243 respondents reported a family member count of 4 members. This shows that most of the respondents belong to a nuclear family structure. It was also found after analysis that there is a single working member for 161 respondents and two working members for 221 respondents. (**Figure 3**)
- 4) The lockdown brought changes in the behavior of people to visit outside their homes for the purchase of groceries, medical goods, and other essential items. 257 respondents answered that they stock goods and groceries by visiting twice a week to the stores. (**Figure 4**)
- 5) 127 respondents reported their monthly family income to be between 1lakh to 2lakh. The lowest category of monthly family income of 20000 to 40000 has been reported by 43 respondents. This shows that none of the respondents filling this survey questionnaire belonged to below the poverty line. (**Figure 5**)
- 6) The majority of the respondents reported their monthly expenditure in the range of 30k-50k before lockdown. (**Figure 6**)

7) During the lockdown, the people operating their businesses are the most affected followed by people employed in private sector jobs. 102 businesses reported a decrease in their earnings while 18 reported a complete shutdown. 104 respondents employed in private jobs reported a decrease in their salaries, 32 were not compensated for their work during the lockdown and 17 lost their job. (*Figure 7*)

8) 424 respondents out of 456 reported a decrease in earnings. Only 32 respondents said that their earnings have been increased. (*Figure 8*)

9) Coincidentally it was found that the number of respondents to report a change in their monthly expenditure during the lockdown as increased or decreased are the same with 228 counts falling in each of the categories. (*Figure 9*)

10) During the lockdown, most Indian households have to change their expenditure pattern by shifting from some items to other items. Also due to a decrease in the dispensable income, households have to prioritize and optimize their spending. (*Figure 10*)

- It was found that expenditure on Petrol/Fuel or Travelling expenses, Children School/College or Tuition Fee, Online/Offline Shopping and Online Food ordering reported a decrease in expenditure.

- Expenditure on LPG/Kitchen Fuel, Mobile Recharges, Wi-Fi/ Internet services, Medical goods, and Online Entertainment subscriptions showed an increase in expenditure.

- Reduction on expenditure on petrol/Fuel/traveling and School/college Fees of children is evident as people were asked to remain inside their homes during the period of lockdown and companies have to shift to a work-from-home mode for their employees and school/college were also closed for the duration and worked on methods to shift their classroom from offline face-to-face medium to online medium. Thus households saved expenditure on these items.

- Due to the shift to a work-from-home model for working members and education through the online medium for children. People have to spend more than usual on Internet/Wi-Fi services, mobile data pack recharges and they have more leisure time, thus the expenditure on online entertainment subscriptions was also increased. It is also found that as all family members stayed at home and due to fear of the spread of the virus, online shopping and online food ordering were reduced while home-cooked meals are mostly preferred, this resulted in more family time together and an increase in expenditure on the kitchen fuel.

- Despite the decrease in the dispensable income of the households, and non-operation of the business, payment of rent for house and office premises and EMI continue to burn a hole in the pocket of the households.

11) **Output Explanation for Model-1 (*Figure 11 and Figure 12*)**

- **Equation:** $\ln(\text{Effect on earnings} / (1 - \text{Effect on earnings})) = -6.3278 + 0.3705 * \text{Pvt. Job} - 0.5263 * \text{Govt. Job} + 1.2507 * \text{Business}$

- **Null Hypothesis is rejected and the alternate hypothesis is accepted.**

- All the parameters of the questionnaire are taken into consideration to check the level of dependency of effect on earning on other factors such as earnings from a private

job, government job, and business during the lockdown period.

- Each unit change in “earnings from private job” will increase the effect on earnings by 0.3705.

- Each unit change in “earnings from a government job” will decrease the effect on earnings by 0.5263.

- Each unit change in “earnings from business” will increase the effect on earnings by 1.2507.

- The confidence level taken is 95%.

- The most important aspect of running this logistic regression is p-value which tells about whether the independent variable is significant for the dependent variable or not. If the p-value is smaller, we can strongly reject the null hypothesis and accept the alternate hypothesis. As the confidence level is taken as 95 percent, so if the p-value is less than 0.05 then the respective independent variable is significant and we can reject the null hypothesis and accept the alternate hypothesis as for the null hypothesis to be correct the probability is less than 5 percent. In the above summary-table, we can see that the following independent variable are significant: Private Job, government job, and Business.

- The logistics regression in R language divides the data into two sets, namely Training Set and Test Set. Here, 80% of the entire data is used for data processing, and the remaining 20% is used for data testing. Reports and projections are then determined. Accuracy was 96.73 percent for this model. When you look at the model from the accuracy point, the model can be said to suit well.

- The difference between the Null deviance and the Residual deviance tells us the fit for a model is good. Greater the difference better the model. For our model, the difference is considerably good which is a good sign. The logistic regression uses an iterative maximum likelihood algorithm to fit the data which is known as fisher scoring iterations. Here, the number of fisher scoring iterations is 7.

12) **Output Explanation for Model-2 (*Figure 13, 14, 15 and 16*)**

- **Equation:** $\ln(\text{Effect on expenditure} / (1 - \text{Effect on expenditure})) = -18.90039 + 0.30717 * \text{Fuel} + 0.82234 * \text{Mobile Recharge} + 1.23104 * \text{kitchen fuel} + 0.827428 * \text{School/College Fee} - 0.13004 * \text{House/Office Rent} - 0.03695 * \text{EMI} + 3.14303 * \text{Internet/Wi-Fi} - 0.16219 * \text{online food ordering} + 0.29270 * \text{online shopping} + 1.46289 * \text{Medical goods} + 1.11653 * \text{Online Entertainment Subscriptions}.$

- **Null Hypothesis is rejected and the alternate hypothesis is accepted.**

- All the parameters of the questionnaire are taken into consideration to check the level of dependency of effect of expenditure on other factors such as a change in expenditure on Fuel/Travelling, Medical goods, EMI, Rent, Internet/Wi-Fi, Mobile Recharges, Online Entertainment Subscriptions, Online Food Ordering and Shopping during the lockdown period.

- Each unit change in “expenditure on fuel” will increase the effect on expenditure by 0.30717.

- Each unit change in “expenditure on mobile recharges” will increase the effect on expenditure by 0.82234.

- Each unit change in “expenditure on school/college fee” will increase the effect on expenditure by 0.82748.
- Each unit change in “expenditure on house/office rent” will decrease the effect on expenditure by 0.13004.
- Each unit change in “expenditure on EMI” will decrease the effect on expenditure by 0.03695.
- Each unit change in “expenditure on internet/Wi-Fi” will increase the effect on expenditure by 3.14303.
- Each unit change in “expenditure on online food ordering” will decrease the effect on expenditure by 0.16219.
- Each unit change in “expenditure on online shopping” will increase the effect on expenditure by 0.29270.
- Each unit change in “expenditure on medical goods” will increase the effect on expenditure by 1.46289.
- Each unit change in “expenditure on online entertainment subscriptions” will increase the effect on expenditure by 1.11653.
- The confidence level taken is 95%.
- The most important aspect of running this logistic regression is p-value which tells about whether the independent variable is significant for the dependent variable or not. If the p-value is smaller, we can strongly reject the null hypothesis and accept the alternate hypothesis. As the confidence level is taken as 95 percent, so if the p-value is less than 0.05 then the respective independent variable is significant and we can reject the null hypothesis and accept the alternate hypothesis as for the null hypothesis to be correct the probability is less than 5 percent. In the above summary-table, we can see that the following independent variable are significant: kitchen fuel, school/college fee, internet/Wi-Fi, medical goods, and online entertainment subscriptions.
- Also running logistics regression in R language, divides the data into two sets i.e., Training set and Test set. Now, 80 percent of the whole data is taken for training the data and the rest 20 percent is for testing the data. Then, actuals and predictions are calculated. For this model, accuracy came out to be 86.95%. Looking at the accuracy percentage we can say that the model is a good fit.

- The difference between Null deviance and Residual deviance tells us the goodness of fit of a model. Greater the difference better the model. For our model, the difference is considerably good which is a good sign. The logistic regression uses an iterative maximum likelihood algorithm to fit the data which is known as fisher scoring iterations. Here, the number of fisher scoring iterations is 6.

Conclusion

The outbreak of COVID-19 has been one of the pandemics that has never been experienced before worldwide. The lockdown in view to avoid the spread of the virus has brought several changes in the lives of Indian households. It was found that almost 93% of respondents faced a decrease in their family earnings due to changes in the employment of working members employed either in private jobs, government jobs, or running their business. With the members being in business is the most severely impacted followed by members employed in private jobs. This forced

the businesses to adapt to several new innovative techniques and technologies, but for SMEs which face serious money, crunch finds it very difficult to adjust and cope with the changes brought by the pandemic forcing them to completely shut down their operations.

This decrease in earnings also reciprocated in the behavior of the households to spend less, prioritize and optimize their expenditure on various household items. As per the survey, 50% of respondents said their monthly household expenditure decreased and the other 50% said it remained almost the same or increased. The major items contributing to the decrease in expenditure are found to be petrol/fuel/traveling expenses, school/college fee, online food ordering and online shopping whereas items contributing to increase in expenditure are the LPG/kitchen fuel, internet/wifi expenses, mobile recharges, online entertainment subscriptions, and purchase of medical goods in terms of protective gears like masks, hand sanitizers, face shields, PPE kits, etc.

Expense on house/office rent and EMI is found to form one major chunk of the household expenditure which continued to burn a hole in the pockets of the households despite a decrease in the earnings.

Recommendations

The findings of this research paper could be used by government bodies, economists, policymakers, small and big businesses operating into different sectors and industries. They can use this data and findings to strengthen the supply chain for various household items which faces shortage during these times, policymakers can make policies benefitting working members into jobs and businesses who faced a serious loss of earnings. The government bodies can prepare a proactive action plan to cope with such difficulties in times of such a pandemic so that loss to households in terms of shortage of medical goods, essential items, and reduced bandwidth of internet/wifi can be minimized and better dealt with

Limitations

- The analysis was restricted due to the limited reach of our survey through a questionnaire to every state of India.
- The sample data points collected from the survey are limited in comparison to the required data points for such a study.
- The pandemic such as COVID-19 has never been experienced in any part of the world before as a result of which the knowledge of variables to take into account for the first time study are not as accurate as it should have been.
- Due to time limits and personal restrictions, the primary data collection is not up to the mark.
- The majority of the respondents are households who know to operate computers and have access to internet connections, therefore the data of the section of society who don't have computers and internet connectivity cannot be collected for the study.

- Lack of secondary data led to ambiguity on the type of data required and the choice of method of data collection.

Future Scope

- The population could be divided based on their income as lower class, lower middle class, middle class, upper-middle-class, rich, and super-rich to study changes in their expenditure habits during the lockdown as a result of the outbreak of COVID-19.
- A similar analysis could be done on the state-wise data collected from different states of India.
- More depth analysis could be done by dividing the working professionals based on private jobs, government jobs, entrepreneurs, and self-owned business operators to study which has been most impacted due to lockdown as a result of the outbreak of COVID-19.
- The analysis could be further extended to study particularly about the impact of COVID-19 on the job offers and internships of the final year MBA college students and what necessary steps did they took during lockdown to cope with such a scenario both mentally and physically.
To study which strategies and technological innovations various businesses and startups adopted which helped them to be still profitable during COVID-19.

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