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Analysing Effects of COVID-19 on Household Information and Communication Technology Expenditure

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Abstract

The Corona pandemic has made an unprecedented impact on society and hence the way households' consumption behaviour. This study analyses the impact of COVID-19 on household expenditure toward information and communication technology (ICT) devices and services. It presents a comparative assessment between pre- and post-COVID-19 household ICT expenditures. The study applied regression to analyse the data collected through an online survey from 185 respondents in north India. The results show statistically insignificant changes in pandemic-induced households ICT expenditure However, expenditure is increased for low income group households. There are interesting findings which suggest the varying impact of COVID-19 with respect to ICT expenditures by households.
Keywords:-Household Information, Communication, Technology, COVID-19, Expenditure

Introduction

The onset of the corona pandemic, otherwise termed as COVID-19, has made unmatched challenges for the people and Governments across the world. Many economies world over have faced severe and acute losses as the major size of population got infected and rest be restricted with government-mandated lockdown. In India, the coronavirus has infected millions of people since it was reported in early 2020 and many have died. Corona induced hardships continue to have a shocking impact on the lives of people and their development. Therefore, poverty has started rising again facing developing countries increasingly.

This could be an unprecedented phenomenon having a quick and radical impact on household consumption patterns of even food. It has a defining impact on household savings across the economies in the world. The pandemic and resultant government policy responses have affected not only consumption but also time allocations, mental health of people at large. These effects have been rather uneven across individuals, regions, and outcomes (Davis, 2021). However, the pandemic and all its direct and indirect repercussions are mediated primarily through households making decisions about consumption and savings.

The households' purchases decline conditional on the category of goods and services as it was evidenced in the study based on data around the 2008 economic recession by Mian et al.

(2013). Individuals had to prioritize their consumption across products and services. In order to protect their jobs, people had to work from home. Students had no choice but to attend classes online. This phenomenon led to increased requirement of electronic devices and subscription to internet data and other e-contents. The pandemic and its overall effects led to a shift in the allocation of expenditure worldwide, with a preference towards products and services centred around information and communication technology (ICT) expenditure.
So, this study aims at investigating whether the pandemic-induced change in the household expenditure on acquiring and sustaining ICT resources was significant enough. This study is situated in the national capital region, north India. Using the primary data collected from 185 respondents through an online structured questionnaire, the study examines if their significant change in ICT expenditure at household level and further if this change was influenced by the level of income and number of family members who need ICT facilities to work from home or learn online.

Literature Review and Hypotheses

The corona pandemic has not only spread human suffering but also affected the economic systems of the countries across the globe. This environmental disruption has attracted many researchers to explore the impact of COVID-19 on various walks of life of people – health, consumption, social among others. Some researchers such as Andersen et al. (2020) and Chen et al. (2020) studied the consumption response of households to the corona pandemic. Using quantitative approaches, many researchers increasingly embraced modelling the dynamics of the COVID-19 pandemic. They attempted to quantify the economic costs of economic policies and their benefits.
In a study done in US context, Chetty et al. (2020) reported that with lockdown in force, people spent time 20% less than that in earlier period and consumer spending was declined by over 30% while employment and income of low-income-group declined by over 35%. Household savings and consumption showed a significant dip. The long recovery time for the economy, post corona, is further likely to be aggravated with a general decline in demand and changed consumption behavior of people at large giving a flip to growth of economic activities (Martin et al. (2020).
In a comparative study conducted in Thai and the Vietnamese context, Schmidt, Dorosh, & Gilbert (2021) observed that the Covid-19 pandemic has led to restrictions on trade of essential food commodities. The income of households had moved southward while prices northward. Li et al. (2020) in their study conducted in China reported that rural households were found less vulnerable to covid pandemic in comparison with that of urban households who are found to be more vulnerable. The liquidity crisis constraints led to the employment shock and income shock. Hirvonen, Brauw & Abate (2021) studied the comparative effects of covid-19. They found job losses and reduced income as key issues. Through a survey, they observed dietary diversity or food consumption among households had slight changes by the end of August 2020. Researchers have reported that the income stagnation, not the consumption stagnation, results in the poor growth of food consumption (Gao, Wailes& Cramer, 1996).
Lockdown announcement came as a shock to the people who were not prepared in terms of possession of required resources. The number of persons required to work from home for attending office work or attending the school/college classes, obviously, would need more ICT instruments and more internet data.
The review of the literature we could best access, following hypotheses are framed for testing using the data collected through survey method:

Hypotheses

H1: There is no statistically significant difference in Pre and Post Covid-19 ICT total spending by households

H2: There is no statistically significant difference in Pre and Post Covid-19 ICT Hardware spending by households.

H3: There is no statistically significant difference in Pre and Post Covid-19 ICT Software spending by households

H4: There is no statistically significant effect of income group on the change in total spending on ICT by households

H5: There is no statistically significant effect of the number of *need-ICT-facility* family members on the change in total spending on ICT by households

Methodology

The study used cross sectional and conclusive research design. The data used in this study has been collected from primary sources, collected through an online survey. The online questionnaire was developed after a rich discussion with academicians and some households. Initially the questionnaire was shared with 20 respondents as pilot study. Post pilot study, some questions were revised, for example, double barrel questions. After that the online questionnaire was emailed to 360 target respondents using researchers' network and snowball approach of sampling. We received 212 responses. After cleaning the data, we found 185 responses suitable for further processing. The respondents, primarily, were from two geographical regions: Dehradun city, the capital of Uttarakhand state and a tier-2 city and the National Capital Region (NCR) of India. The questionnaire consisted of close ended questions to ensure a respondent-convenient experience to enhance the authenticity of the data.

The variables used in the study include household expenditure on acquisition of ICT related hardware and software, income, and number of family members who needed ICT facilities. The expenditure on hardware, for the study, included expenditure for acquiring computers, mobile handset, tabs, printers etc. while software included expenditure for subscription of online contents and internet data. The *need-ICT-facility* members of the family included a number of school/college going students and members working from home online. We used paired t-test, ANOVA and regression to investigate the impact of covid-19. We have divided the period undertaken for the study into two parts – six months before the commencement of pandemic induced lockdown and six months after that. The pre-covid-19 period is taken till 31 Mar[1] 2020 and post covid-19 period is taken as Apr 1 to Sep 30, 2020.

Results and Discussion

This section deals with the results of the study followed by the discussion on the results. The analysis is presented hypothesis-wise.

[1] In India, the lockdown came into effect from 23 Mar 2020

Hypothesis 1: There is no statistically significant difference in Pre and Post Covid ICT Total Spending by households

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TotalPre	32222.9622	185	38247.94636	2812.04494
	TotalPost	28673.6000	185	33981.80410	2498.39193

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	TotalPre - TotalPost	3549.36216	42633.61104	3134.48542	-2634.79121	9733.51553	1.132	184	.259

The mean household expenditure decreased during the corona pandemic if compared with that of pre-pandemic. However, this change is statistically insignificant. It indicates that anticipating squeeze in income in future, household chose saving over spending on acquisition of ICT facilities.

H2: There is no statistically significant difference in Pre and Post Covid-19 ICT Hardware Spending by households

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ITHSPre	29540.9297	185	37262.85557	2739.61963
	ITHSPost	24995.8324	185	31521.28858	2317.49123

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	ITHSPre - ITHSPost	4545.09730	40916.02104	3008.20569	-1389.91368	10480.10827	1.511	184	.133

The overall average ICT expenditure did not increase after the pandemic started. The total ICT expenditure included expenditure on acquiring hardware and software. The mean expenditure on hardware ICT has also decreased post-pandemic. However, it is not statistically significant. Thus we failed to reject hypothesis two.

H3: There is no statistically significant difference in Pre and Post-Covid ICT Software Spending by households

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ITSSPre	2851.5862	174	6892.08984	522.48798
	ITSSPost	3595.3276	174	7042.71909	533.90716

Paired Samples Test

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	ITSSPre - ITSSPost	-743.74138	8647.36426	655.55499	-2037.65703	550.17427	-1.135	173	.258

The data indicates that the overall average ICT expenditure did not increase. Unlike total and hardware expenditure, the mean expenditure on software ICT has increased post-pandemic. However, this increase in expenditure is not statistically significant. Thus we failed to reject hypothesis three. That is the null hypothesis is supported. So, it could be interpreted that people could manage with existing e-devices but had to pay more for using internet data and other e-contents.

H4: There is no statistically significant effect of income groups on the change in total spending on ICT by households.

Descriptives

Change in Spending

Rs	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound
Up to INR 250000	16	5703.1250	14881.24624	3720.31156	-2226.5314
250000 to 500000	21	-2610.2857	18497.13262	4036.40526	-11030.0795
500000 to 1 million	57	-2643.3684	41160.11310	5451.79016	-13564.6165
Above1 million	91	-5960.3736	50270.55826	5269.78640	-16429.7241
Total	185	-3549.3622	42633.61104	3134.48542	-9733.5155

ANOVA

Change in Spending

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1964023302.140	3	654674434.047	.356	.785
Within Groups	332478938108.595	181	1836900210.545		
Total	334442961410.735	184			

Income is considered, largely, to have an effect on expenditure directly. So, Hypothesis four is tested on the data set and it is observed that the effect of the level of income on change in ICT expenditure during the pandemic is statistically insignificant. However, data indicates that change in ICT expenditure tends to decrease if we go from lower income group to higher income group. Putting otherwise higher income groups lower the change in expenditure post pandemic. It means that higher income groups, consistent with common belief at large, had ICT support facilities even before the onset of the pandemic. However, lower income groups,

in view of their poor affordability, did not have ICT facilities which they had to have – for school going children and sustaining the job by working online from home.

H5: There is no statistically significant effect of number of *need-ICT-facility* members in the familyon the change in total spending on ICT by households

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4056247321.323	1	4056247321.323	2.247	.136[b]
	Residual	330386714089.413	183	1805391880.270		
	Total	334442961410.735	184			

a. Dependent Variable: ChangeinSpending

b. Predictors: (Constant), School, College going or working members in family

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-12884.659	6967.597		-1.849	.066
	Need-ICT-facility members in family	3517.372	2346.615	.110	1.499	.136

a. Dependent Variable: ChangeinSpending

The more number of family members attending classes or working from home online need more e-devices and more data and hence higher expenditure. But data shows that the number of family members requiring ICT facilities has a statistically insignificant impact on the change in ICT expenditure between pre- and post-pandemic (see table).

The overall result of the study indicates that the household expenditure on ICT did not change statistically significantly after the onset of the pandemic induced lockdown. Though the expenditure on purchasing the data and other e-contents increased in absolute terms, this change was not statistically significant. Income level also did not show any significant effect on the expenditure pattern if compared pre- and post-pandemic. So was the result for the relationship between the family size (number of members using ICT devices) with the change in ICT expenditure. The results of this study are inconsistent with the common belief that work-from-home made people spend more on acquiring ICT resources. This is an interesting finding. However, the prices of the ICT device increased indicating more demand in general. But the prices might also increase because of poor supply that is the supply shock. Therefore, a qualitative study is needed to explore why people avoided spending on acquisition of ICT resources. Whether it was the propensity to save for anticipated uncertain situations down the months or year or some other reasons? Further studies would be better to explain the phenomena.

Conclusion

The study investigated the impact of an external environmental turbulence, the onset of COVID-19 on the household expenditure on ICT –hardware and software. The data was collected from 185 respondents of a tier I and a tier II city of India. The overall results do not

indicate any significant change in the household expenditure on purchase of additional ICT devices and subscription during the pandemic. These findings do not confirm the commonly held view that the lockdown caused people to increase expenditure on acquisition of ICT facilities to stay connected through online mode. The study has implications for different stakeholders including corporations and researchers. The firms would need to take a very critical view of the market dynamics influenced by environmental turbulence such as covid-19. The study has certain limitations such as even pilot study was conducted online due to restricted physical mobility. In view of the results' indication of no significant impact of the pandemic on ICT expenditure, further studies may be conducted using a qualitative research approach exploring why households' ICT expenditure could not increase after the spread of corona pandemic and hence commencement of the lockdown. Further, studies with focus on other household expenditure may be undertaken to explore pandemic induced changes in household consumption and expenditure pattern

References

1. Andersen, A. L., Hansen, E. T., Johannesen, N. & Sheridan, A. (2020). Pandemic, shutdown and consumer spending: Lessons from Scandinavian policy responses to COVID-19. arXiv preprintarXiv:2005.04630.
2. Atkeson, Andrew (2020) "What Will Be the Economic Impact of COVID-19 in the US? Rough Estimates of Disease Scenarios," NBER Working Paper w26867.
3. Barro, Robert J., José F. Ursúa, and Joanna Wang (2020) "The Coronavirus and the Great Influenza Pandemic: Lessons from the 'Spanish Flu' for the Coronavirus's Potential Effects on Mortality and Economic Activity" NBER Working Paper w26866.
4. Chen Haiqiang, Wenlan Qian, and Qiang Wen, 2020. "The Impact of the COVID-19 Pandemic on Consumption: Learning from High Frequency Transaction Data," Working Paper.
5. Chetty, Raj, John N. Friedman, Nathaniel Hendren, and Michael Stepner (2020). Real-Time Economics: A New Platform to Track The Impacts of COVID-19 on People, Businesses, and Communities Using Private Sector Data. Working paper No. w27280, National Bureau of Economic Research.
6. Coibion, O., Gorodnichenko, Y., & Weber, M. (2020). The cost of the covid-19 crisis: Lockdowns, macroeconomic expectations, and consumer spending (No. w27141). National Bureau of Economic Research.
7. Davis, G. (2021) The many ways COVID-19 affects households: consumption, time, and health outcomes. Rev Econ Household 19, 281–289. https://doi.org/10.1007/s11150-021-09563-w
8. Gao, X. M., Wailes, E. J. & Cramer, G. L. (1996). A two-stage rural household demand analysis: microdata evidence from Jiangsu province, China. American Journal of Agricultural Economics, 78(3), 604-613.
9. Hirvonen, K., Brauw, A., & Abate, G. T. (2021). Food Consumption and Food Security during the COVID-19 Pandemic in Addis Ababa. American Journal of Agricultural Economics, 103(3), 772-789. doi:10.1111/ajae.12206
10. Jena, P. K. (2020). Online learning during lockdown period for covid-19 in India. International Journal of Multidisciplinary Educational Research (IJMER), 9.
11. Jie Li, Quanyun Song, Changyan Peng & Yu Wu (2020) COVID-19 Pandemic and Household Liquidity Constraints: Evidence from Micro Data, Emerging Markets Finance and Trade, 56:15, 3626-3634, DOI: 10.1080/1540496X.2020.1854721

12. Lloyd, P. J. (1975). Substitution effects and biases in nontrue price indices. The American Economic Review, 301-313.
13. Martin, A., Markhvida, M., Hallegatte, S. and Walsh, B (2020). Socio-Economic Impacts of COVID-19 on Household Consumption and Poverty. Economics of Disasters and Climate Change, 4, 453–479. https://doi.org/10.1007/s41885-020-00070-3
14. Mian, Atif, Amir Sufi, and Kamelesh Rao, 2013. "Household Balance Sheets, Consumption, and the Economic Slump," Quarterly Journal of Economics 128(4): 1687-1726.
15. Schmidt, E., Dorosh, P., & Gilbert, R. (2021). Impacts of COVID-19 induced income and rice price shocks on household welfare in Papua New Guinea: Household model estimates. Agricultural Economics,52(3), 391-406. doi:10.1111/agec.12625