Economics Bulletin

Volume 42, Issue 2

Consumption Shocks in Rural India during the COVID-19 Lockdown

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Abstract

Using data from the World Bank survey on 'COVID-19-Related Shocks in Rural India 2020', this paper finds that while more extreme and overtly visible forms of consumption shock were less common, almost 30% of rural households in India had to reduce their intake during the lockdown in 2020. This is alarming from the policy perspective since even the pre-pandemic average intake of Indians fell short of the recommended levels. Hunger, anemia and undernutrition have been problems plaguing the Indian economy even during the high-growth years. The paper finds that the poor, the migrants and the non-cultivators in rural India had significantly higher likelihoods of facing consumption shocks during the lockdown. Access to state relief offered through public programs like the MGNREGA and PDS did not have a significant association with the chance of facing consumption shocks, particularly when the state of residence was controlled for.

I am grateful to the editor, three anonymous reviewers and Achin Chakraborty of Institute of Development Studies Kolkata for their insightful comments on the paper.
Citation: Simantini Mukhopadhyay, (2022) "Consumption Shocks in Rural India during the COVID-19 Lockdown", *Economics Bulletin*, Volume 42, Issue 2, pages 827-839
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Submitted: June 13, 2021. **Published:** June 30, 2022.

1. Introduction

The sudden lockdown imposed by the Indian state during the initial stage of COVID-19 in March 2020 has been described as 'the largest COVID-19 national lockdown in the world' (*The Lancet* 2020). It led to huge job losses and massive reverse migration, arguably the largest mass migration since the country's partition in 1947 (Mukhra *et al.* 2020; Ray and Subramanian 2020 2020). Thousands of migrant workers apprehended an extension of the lockdown, imminent job loss and hunger, and flocked to their native villages. Some studies claimed that rural India has been more resilient to the COVID-19 pandemic, with the agricultural sector bearing the promise of sooner recovery (Mahapatra 2020).

Reports have also shown that the lockdown brought about immense miseries for people in the villages, who faced increasing burden of debt, hunger and severely limited access to services (Bera 2020). All of this happened against the backdrop of India's hunger paradox: with an astronomically high buffer stock of food grains (104 million tonnes in June 2020), the country continued to slip down the league table in terms of the hunger index. Commentators have discussed the detrimental consequences of the pandemic on the already existing high burden of food insecurity and hunger in India (Sinha 2021).

Policy responses to the crisis, which varied across the Indian states, were severely constrained by the absence of conclusive evidence. Recognizing this gap, the World Bank, in collaboration with IDinsight and the Development Data Lab, conducted a survey titled 'COVID-19-Related Shocks in Rural India 2020'. The survey shows that the proportion of households experiencing dire and overtly visible hunger (the ones who had to spend a whole day without eating, for instance) was not overwhelmingly high. However, more than a quarter of the households reported that they had to reduce their meal portions. This is alarming, since many studies have shown that even before the pandemic daily intakes of a vast majority of Indians were inadequate. Calorie consumption had been falling over time even among the poor in rural India. This has been explained in terms of different factors, including a food budget squeeze caused by a rise in expenditure on non-food items (Basole and Basu 2015).

Murali and Maiorano (2021) have summarized the findings of the study on the magnitude of consumption shocks experienced by the overall rural population in the surveyed states. This paper uses the dataset to find out how the likelihood of facing consumption shocks during the lockdown differed across sections of the population in rural India using a multivariate specification. Using probit regression, this paper examines if migrants and non-migrants had different chances of facing such shocks. It also asks if the likelihood differed between agricultural and non-agricultural households and across categories of economic status and social group affiliation. How far state policies have been able to mitigate the shocks seems to be another intriguing question. We ask if state relief, offered in terms of provisioning of food grains and employment security, were associated with lower chances of facing consumption shocks during the lockdown.

2. Background

The six states that the survey covered are Andhra Pradesh, Bihar, Jharkhand, Madhya Pradesh, Rajasthan and Uttar Pradesh. The states are differently placed with respect to economic and human development indicators. Bihar, Uttar Pradesh, and Jharkhand are the three poorest states of India (in the same order) in terms of Per Capita Net State Domestic Product (NSDP). Among the surveyed states, only Andhra Pradesh has a PCNSDP above the all-India average (RBI 2020). The lower socioeconomic status of the five other states has been recognized in policy parlance since long. Now clubbed among the EAG (Empowered Action Group) states, these states were previously called BIMARU (meaning sick in Hindi) (Bose 1998). Jharkhand was then a part of Bihar. In terms of multidimensional poverty, these states are on a par with the poorest countries of Africa (Drèze & Sen 2013). The rates of infection and death have varied between the Indian states. Dutta and Fischer (2020) discussed how the public policy responses to the pandemic were shaped by the existing institutional arrangements of local governance in the states.

The Scheduled Castes (SCs) and Scheduled Tribes (STs) are the historically disadvantaged social groups, accorded special status by the Constitution of India with the aim of positive discrimination. A report by the National Campaign on Dalit Human Rights (NCDHR) shows that state relief did not reach the SCs and STs in rural India during the first wave of the pandemic. The study covered five states of which three are common with the survey that this paper uses — Andhra Pradesh, Bihar and Rajasthan (NCDHR 2020).

According to the 2011 Census, over 450 million Indians had migrated within the country. A large proportion of these migrants are younger men from disadvantaged social groups who moved out of their villages to find employment in cities. After the pandemic struck migrant workers often had to go with food at the destination states because they did not have valid documents[1] (Kumar and Choudhury 2021).

Social policy in India has been able to expand its coverage in the recent years. With many of the public benefits now becoming sanctioned legal entitlements, there has been a marked shift from the previous welfare model to a rights-based approach. However, there have been huge differences in the effectiveness of public policy across the Indian states (Drèze 2016). This paper specifically looks at the effectiveness of two public programmes, the Public Distribution System (PDS) and Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), in mitigating consumption shocks faced by rural households during the lockdown in 2020. Introduced after the second world war, India's PDS is now the world's largest universal system for the distribution of subsidised food grains. The programme has been revised a number of times with a focus on more efficient targeting. It is now backed statutorily by the National Food Security Act, the introduction of which in 2013 sanctioned the right to food as a legal entitlement. Among the surveyed states, Andhra Pradesh traditionally has a more efficient PDS. Bihar, Jharkhand and Madhya Pradesh have earned praise for reducing leakages and improving coverage after 2011-12 (Himanshu 2013). The National Rural Employment Guarantee Act, enacted in 2005 and later renamed as MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), guarantees wage-employment in a financial year for every rural household with an adult member volunteering to do unskilled manual work. The scheme is based on the principle of self-selection, so that every rural adult is eligible to get enrolled. MGNREGA has had mixed success, with substantial differences in outcomes between states. Among the

[1] Media reports showed that the central government's 'One Nation One Ration Card' scheme, which mandated that a ration card would be valid throughout the country, met with very limited success.

surveyed states, Bihar and Uttar Pradesh had the worst indicators of performance with respect to average number of workdays, payment on time and work completion rates. Andhra Pradesh and Jharkhand were the best performers, followed by Rajasthan and Madhya Pradesh (Mathur and Bolia 2016).

3. Data and Methods

3.1 Data Source

We use unit-level data from the survey titled COVID -19-Related Shocks in Rural India 2020, conducted by the World Bank using Computer Assisted Telephone Interview (CATI) techniques (Pinto and Acharya 2020). Three successive rounds were conducted in the six states in May, July and September 2020. The questionnaire had sections on agriculture, income and consumption, migration, access to relief, and health. Since a single, unified sample frame could not be used for selecting phone numbers, different sample frames had to be used for states and rounds. Round 3 covered 5,200 unique households, and the number of households covered in all three rounds was 1,068. A post-stratified weight was generated using a 'raking to margins' process. Using this weight in generating population estimates corrects for within-state and between-state imbalances in sample selection.

This paper uses data from the third round of the survey since the merged file for the three rounds had only 226 households who reported consumption shocks. This would make further disaggregation infeasible. Moreover, using the third round has its obvious advantages because the questions on consumption shock are of a cumulative nature.

3.2 Variables of Interest

We construct a variable called shock which takes a value 1 if during the lockdown due to the lack of money or other resources, the household 1) limited portion size or reduced meals, 2) ran out of food, 3) had a member who was hungry but did not eat, or 4) had a member who went without eating for a whole day, and 0 otherwise.

We try to find if the likelihood of facing such a shock is associated with the household's state of residence, social group affiliation, economic status, if the household has migrants and if the household's main occupation is cultivation. We also look into the association between availability of public services and the experience of consumption shocks. To avoid potential endogeneity (since facing a consumption shock and availing of public services may be jointly determined by unobserved household-level behavioural factors.) and to capture the level of public provisioning in the locality, we include the proportion of people in the primary sampling unit who received free food grains from PDS and that of households which did not get MGNREGA work despite trying. Other relevant variables such as the proportion of households receiving delayed MGNREGA payments could not be included because of a large number of cases with missing values.

Household income figures could not be used because of a high proportion of missing values. The dataset defines a household's poverty probability as its likelihood of falling below the benchmark daily income of $3.80. It provides the PPI (Poverty Probability Index) values,

calculated using ten indicators (household size, general education level of the female head/spouse, possession of a refrigerator, a stove/gas burner, a pressure cooker/pressure pan, television, an electric fan, an almirah/dressing table, a chair, stool, bench, or table and a motorcycle, scooter, motor car, or jeep). It also classifies the households into PPI quartiles (Q1: poverty probability greater than 0.75, Q2: poverty probability between 0.50 and 0.75, Q3: poverty probability between 0.25 and 0.50 and Q4: poverty probability less than 0.25) (World Bank 2021; details available online: https://www.povertyindex.org/country/india). We use these poverty probability quartiles to indicate economic status.

3.3 Methods

We try to find the association between the likelihood of facing shocks with background characteristics described above using probit regression. We use two specifications: Model 1 and Model 2, without and with state fixed effects respectively. We estimate the following equation.

$$S_i = \beta X_i + \mu_i \; \forall \; i = 1, \dots, n \qquad (1)$$

S_i stands for the probability of reporting a consumption shock and X_i is our vector of independent variables. The sign on the estimated coefficient β is the direction in which each regressor in our model affects the probability of reporting a consumption shock during the lockdown. X_i includes state dummies in Model 2.

Robustness Checks

Keeping the model specification the same, we run Linear Probability Model (LPM) to check if our results are robust. Since in LPM the variance of the error term is not homoscedastic (Cameron and Trivedi 2005: 471), we correct the standard errors for heteroscedasticity. Moreover, because the size of the surveyed states varies substantially, the error variance may not be constant across states. This would make the maximum likelihood estimates inconsistent and the estimate of the covariance matrix incorrect. The heteroscedastic probit model has been suggested to deal with such heterogeneity (Alvarez and Brehm 1995). We check the robustness of our results using heteroscedastic probit model.

4. Results and Discussion

4.1 Sample Characteristics

As Table 1 shows, the number of COVID-19 cases per 100,000 population did not differ widely between the surveyed states in September 2020. While the table lists the social group affiliation of the surveyed households, we point out that there are substantial differences in the composition of population across the six states. Madhya Pradesh and Jharkhand have higher proportions of tribal households (15% and 10% respectively) and the percentage of Muslims is higher in Bihar and Uttar Pradesh (15% and 13% respectively). More than half of the surveyed households reported cultivation to be their major occupation during the preceding year. About 7% of these households did not engage in cultivation during monsoon of 2020, which coincided with the

worst phase of the first wave of the pandemic. More than one-fourth of the households had at least one migrant, most of whom returned to their villages during the pandemic.

About 88% of the households reported having received something (rice/wheat/pulses/other) for free from the PDS shops. More than a quarter of the households reported that they sought MGNREGA work but were unsuccessful. The survey asked all the respondents to state the average per day MGNREGA wage in August in the area. On average, this rate was quoted to be Rs. 192. This is not only way below the prevailing rates for unskilled agricultural workers, but it also falls short of the rate promised by the government. In end-March 2020, the Indian Finance Minister announced that MGNREGA wages were to be raised to Rs. 202 for the fiscal year 2020-21, as a part of the COVID-19 relief package for rural India (Edwin 2020).

Close to 30% of the rural households reported having faced at least one kind of consumption shock during the lockdown. Our estimate of the burden of consumption shock differs from that calculated by Murali and Maiorano (2021) though they use the same dataset. We argue that their approach is flawed since they use question 3.5 of the questionnaire to estimate the burden of consumption shock. While questions 3.1—3.4 ask if the household has faced each kind of consumption shock (detailed in Section 3.2), question 3.5 separately asks if the household has faced 'none of the above'. This variable has missing values for about 60 percent of the cases. Murali and Maiorano (2021) take the complement of question 3.5 and estimate the proportion of households experiencing a consumption shock during the lockdown to be 37%, which is an overestimate for the reason stated above. We also note that the most common consumption shock faced by households was to limit the portion size of their meals. More severe and overtly visible shocks (such as the household having no food at all or someone going without food for a whole day) were less common.

Table I: Sample Characteristics

Background Characteristic		Percentage of Households (Survey Estimates)
State (# of cases per 100000 population) September 2020^	Rajasthan (134)	11.8
	Uttar Pradesh (141)	31.41
	Bihar (132)	17.76
	Jharkhand (115)	5.75
	Madhya Pradesh (115)	13.54
	Andhra Pradesh (111)	19.74
Social Group Affiliation	Hindu Upper Caste	20.78
	Hindu SC	15.07
	Hindu ST	6.57
	Hindu OBC	42.24
	Muslim	10.17
	Other Religions	5.16
Agriculture	Main occupation during last year (2019): Cultivation	54.89
	Cultivator households that were cultivating land in monsoon 2020	93.09
Migration Status	Households without migrants	73.54
	Households with migrants who returned during the lockdown	22.01
	Households with migrants who did not return during the lockdown	4.45
State Relief	Received nothing free from PDS	11.74
	Tried but got no MGNREGA work	28.41
	Tried and got work for some of the days	11.95
	Tried and got work for all of the days	5.80
	MGNREGA workers reporting delayed wage payments	52.16
	Average MGNREGA wage in the area (reported)	191.86^^
Consumption Shock during the lockdown due to lack of money or other resources	Had to limit portion size or reduced meals	26.1
	Ran out of food	6.37
	Someone in the household was hungry but did not eat	6.59
	Someone in the household went without eating for a whole day	3.94
	Any of the above happened	28.65

Source: Author's Calculations from Unit-Level Dataset of COVID-19-Related Shocks in Rural India 2020, Round

^Number of cases from Deccan Herald, 17 September 2020; Projected population 2021 from https://uidai.gov.in/ ^^ in Rupees

4.2 Simple Cross-Tabulation

Table 2 presents the cross-tabulation of the experience of consumption shock across background characteristics. It is no surprise that Bihar, the poorest state, had the highest proportion of households that experienced a shock. Rajasthan and Jharkhand reported the lowest and second-lowest proportions respectively. The other three states reported similar burden of consumption shocks. It seems puzzling how Jharkhand, a state which Drèze & Sen (2013) place along with Bihar in the league of the poorest African countries, Sierra Leone and Mozambique, has managed to escape a severe crisis in terms of consumption shocks. Again, Andhra Pradesh being a richer state, with a resilient public delivery system has seen a crisis similar in scale to that of Madhya Pradesh and Uttar Pradesh. These results would demand further probing if anomalies in survey design are ruled out.

There seems to be a clear gradient in the experience of consumption shocks across the PPI quartiles. More than one-third of the households in the poorest quartile have faced consumption shocks. This comes down to one-fourth for households in the richest quartile. Among the social groups, Muslims have the highest proportion of households that have faced consumption shocks. The extent of shocks has been similar for the other social groups. This seems counter-intuitive since even in the pre-pandemic times STs had the highest levels of hunger and undernutrition. Saxena *et al.* (2020) conducted a similar, though smaller survey on hunger and consumption shocks during the lockdown in the tribal villages of southern Rajasthan. According to their estimates, 47% of the respondents reported that they had to cut down meal sizes or skip meals. The qualitative accounts provided in the NCDHR report also suggest that the disadvantaged sections had to face greater shocks in terms of access to food (NCDHR 2020).

The extent of consumption shocks has been lesser for cultivator households and more for households with migrants. Studies have shown how limited resources had to be shared to feed a larger number of mouths when migrants returned. Many of them had exhausted their savings since transportation had become difficult and astronomically costly with the sudden lockdown. Interestingly, households with migrant members who did not return to their homes during the pandemic were the ones with the greatest extent of consumption shocks. The last block of Table 2 seems to suggest that access to state relief (both free food grains from PDS and MGNREGA work) could mitigate the chances of facing consumption shocks during the lockdown.

Table II: Experience of Consumption Shocks During the Lockdown by Households

Background Characteristic		Percentage of Households Facing Consumption Shocks (Survey Estimates)
State	Rajasthan	14.2
	Uttar Pradesh	28.4
	Bihar	45.1
	Jharkhand	20.4
	Madhya Pradesh	26.8
	Andhra Pradesh	26.6
Poverty Probability Quartiles	Q1 (Poverty Probability >75%)	36.8
	Q2	31.3
	Q3	26.1
	Q4 (Poverty Probability <25%)	25.3
Social Group Affiliation	Hindu Upper Caste	26.5
	Hindu SC	29.2
	Hindu ST	25.4
	Hindu OBC	27.3
	Muslim	38.3
	Other Religions	31.5
Agriculture	Last year's main occupation: Cultivation	23.2
	Non-cultivator Households	35.6
Migration Status	Households without migrants	27.26
	Households with migrants who returned during the lockdown	29.69
	Households with migrants who did not return during the lockdown	46.43
State Relief	Received nothing free from PDS	29.99
	Received something (food grain) from PDS	26.66
	Tried but got no MGNREGA work	30.26
	Tried and got work for some of the days	23.84
	Tried and got work for all of the days	21.78
	MGNREGA payment on time	21.10
	MGNREGA delayed payment	23.70

Source: Author's Calculations from Unit-Level Dataset of COVID-19-Related Shocks in Rural India 2020, Round 3

4.3 Regression Results

Table 3 shows that the pattern of bivariate association of covariates with the likelihood of facing consumption shocks is mostly retained in the multivariate specifications.

Model 1

Compared to the bottom PPI quartile, all other quartiles had significantly lower chances of facing a consumption shock. However, the difference between Q1 and Q2 was weakly significant. All social groups had statistically similar likelihoods of facing shocks. As discussed in the previous section, this seems to be counter-intuitive and requires further probing.

Cultivator households seemed to have had a significantly greater resilience to these shocks. Households with migrants had a significantly greater exposure to food insecurity and hunger. However, those with migrants who did not return seemed to be the worst affected. This category probably included the most vulnerable households which failed to provide a fallback option to the migrants. As Drèze and Sen (1992) note, "People who possess no means of production excepting their own labour power, which they try to sell for a wage in order to earn an adequate income to buy enough food, are particularly vulnerable to changes in labour market conditions. A decline in wages vis-a-vis food prices, or an increase in unemployment, can spell disaster for this class." This is exactly what happened in rural India during the lockdown in 2020.

A household that was located in an area where the provisioning of free food grains by the PDS was higher, had a significantly lower chance of facing a shock, though the statistical strength of the association was low. In the multivariate specification, the functioning of MGNREGS in the locality seemed to have no effect on such chances. This may be because the principle of self-selection is implicit in the nature of the employment guarantee scheme, in contrast to PDS (Drèze & Sen 2013). Thus, access to MGNREGA work at the community level might have been rendered insignificant once socioeconomic factors have been controlled for.

Model 2

Most of our main results remain unaltered when we do a state fixed effect probit regression. We find that apart from Jharkhand, the likelihood of facing consumption shocks was higher in all the states compared to Rajasthan. Households in Bihar had a significantly higher likelihood of facing such shocks, compared to all the other states. A striking result is that once the state of residence is controlled for, the PSU-level access to free food from PDS becomes non-significant. This would imply that there were no significant within-state differences in governance during the COVID-19 crisis, particularly with respect to public provisioning of food grains.

Treating each Dimension of 'Shock' Separately

Table A1 shows the results of the regressions of each of the four dimensions of consumption shock (namely, if during the lockdown due to the lack of money or other resources, the household 1) limited portion size or reduced meals, 2) ran out of food, 3) had a member who was hungry but did not eat, or 4) had a member who went without eating for a whole day. While the results for 1), 2) and 3) mimicked the findings for the general shock variable, 4) was poorly associated with the covariates. This may be because of low sample size—less than 4% of the households reported that a member went without food for an entire day. Similar findings are

obtained when we run state fixed effects regressions for each dimension of consumption shock (results not reported).

Table III: Probit Regression of the Likelihood of Facing Consumption Shocks during the Lockdown by Households

Covariates		Marginal Effects	
		Model 1	Model 2 (State Fixed Effects)
PPI Quartile Base Category : Q1 (Probability of Poverty > 0.75)	Q2	-0.05*	-0.04
	Q3	-0.10***	-0.08***
	Q4	-0.12***	-0.09***
Social Group Affiliation Base Category: Upper Caste Hindu	Hindu SC	0.16	0.03
	Hindu ST	-0.02	0.01
	Hindu OBC	-0.01	0.01
	Muslim	0.06	0.06
	Other Religions	0.07	0.10**
Cultivator Household Base Category: Non-Cultivator Household		-0.12***	-0.11***
Migration Status Base Category: Household without a Migrant	Household with Migrant(/s) who have not returned	0.19***	0.15***
	Household with Migrant(/s) who have returned	0.04*	0.03
State Relief	% of Households in the PSU that received free food grains	-0.03*	0.02
	% of Households in the PSU with no MGNREGA work despite trying	-0.01	-0.01
State of Residence (Base Category: Rajasthan)	Uttar Pradesh	-	0.12***
	Bihar	-	0.28***
	Jharkhand	-	0.03
	Madhya Pradesh	-	0.13***
	Andhra Pradesh	-	0.12***

Source: Author's Calculations from Unit-Level Dataset of COVID-19-Related Shocks in Rural India 2020, Round 3

4.4 Robustness Checks

All our major results remain unaltered when we run LPM with robust standard errors for Model 1 and Model 2 (Table A2). Results of the heteroskedastic probit model (Table A3) show that the null hypothesis of homogenous error variance cannot be rejected. The Wald test of homogeneity

of the variance function shows that the $\chi^2(1)$ statistic of 0.94 is non-significant, indicating that heteroskedasticity does not exist in our model.

5. Conclusion

Economists have cautioned that the COVID-19 pandemic is further worsening inequalities across the world. Analyzing income data for different countries in the five years following five previous epidemics, an IMF study has shown that the Gini coefficient steadily increased in each case. Public policies, designed with the aim of risk sharing, have been largely ineffective in protecting the least advantaged sections (Furceri *et al.* 2020). Studies in the Indian context have similarly argued that COVID-19 seems to have exacerbated the already existing and deep-rooted structural inequalities in the country (*The Lancet* 2020).

This paper finds that while more extreme and overtly visible forms of consumption shock were less common, almost 30% of rural households had to reduce their intake during the lockdown in 2020. This is alarming from the policy perspective since even the pre-pandemic average intake of Indians fell short of the recommended levels. Hunger, anaemia and undernutrition have been problems plaguing the Indian economy even during the high-growth years. About a billion Indians suffered from 'hidden hunger' or micronutrient malnutrition (Ritchie *et al.* 2018).

The paper found that the poor, the migrants and the non-cultivators in rural India had higher likelihoods of facing consumption shocks during the lockdown. There was a strong state effect which subsumed the effect of relief programmes. Access to MGNREGA and PDS did not have a significant association with the chance of facing consumption shocks once state-fixed effects were introduced.

After the first wave reached its peak in September 2020, there was a dramatic decline in the number of cases. This was followed by the more severe second wave of 2021, which led to health system failures in many parts of the country. Lockdowns were imposed in many states and the vulnerable sections, including migrants, were hit even harder. Economists have cautioned that the consequences of the second wave in rural India would be more severe than those of the first wave (Inani 2021). Increasing poverty, high unemployment, stagnant wages, and growing indebtedness calls for urgent public action in rural India. Relief packages need to be revamped in terms of securing the rights to food, work and livelihood of rural Indians.

The data used in this paper has its limitations. Food insecurity could be measured better by including questions on anxiety and uncertainty regarding food, quality of food and also physical consequences of inadequate diet (Nguyen *et al.* 2021). Lack of detailed information on the major occupation of the household also limited the analysis. Moreover, the paper does not claim to causally link the lock-down to consumption patterns. Given the criticality of the issues, we stress on the need for carefully designed large-scale surveys and timely analysis of the same.

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