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FOOD SECURITY IN CHHATTISGARH DURING COVID-19: THE ROLE OF PDS

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Abstract
Covid-19 began as a public health crisis and has implications for food security. The State of Food Security & Nutrition in the World 2021 report notes that the pandemic has made it harder to achieve food security, the 2020 estimate for the prevalence of undernourishment was between 9.2 to 10.4%. Even before the pandemic, India accounted for the highest number of undernourished people in the world. Two pillars of food security are access and availability. The access can be improved by increasing the incomes of consumers or making the grains cheaper. The Public Distribution System (PDS) does the latter by subsidizing food grains. In a time of declining availability of food grains and access due to a fall in income levels, the government scheme has the potential to ensure food security. This scheme has been extended multiple times since March 2020, most recently till March 2022.Thus, measuring its impact in Chhattisgarh is a fruitful exercise. This paper aims to answer the following question: does the Pradhan Mantri Garib Kalyan Ann Yojana, which guarantees households 5 kilograms of free rice or wheat and 1 kilogram of pulses, improves food security in Chhattisgarh? Ideally, the provisioning of free rice and wheat (cereals) should cause a shift in food expenditure away from cereals to other food groups.

Keywords
Food security, Pandemic, Public Distribution System.

Introduction

Covid-19 was declared a pandemic on March 11, 2020. What began as a public health crisis has implications for food security. The State of Food Security & Nutrition in the World 2021 report notes that the pandemic has made it harder to achieve food security. The 2020 estimate for the prevalence of undernourishment was between 9.2 to 10.4%. Even before the pandemic, India accounted for the highest number of undernourished people globally (22% of the world's undernourished). Despite India being a major food producer and is attributed to economic inequality and high unemployment, limiting the means of procuring food.

The National Food Security Act, 2013 guarantees a regular flow of subsidized food grains for Antyodaya Anna Yojana and Priority Households. The former is guaranteed 35kgs a household while the latter is given 5kg of grains per person. This includes rice, wheat, and kerosene. As the national lockdown was initiated, the finance minister announced the Pradhan Mantri Gareeb Kalyan Anna Yojana (PMGKAY). The scheme guarantees an additional 5kg of free-of-cost food grains (rice or wheat) to NFSA beneficiaries. This was meant to be a temporary measure from April to June 2020, but given the pandemic situation, had been extended till March 2022. The scheme also guarantees 1kg of pulses per household.

Two pillars of food security are access and availability. The access can be improved by increasing the consumers' incomes or making the grains cheaper. The Public Distribution System (PDS) does the latter by subsidizing food grains. PMGKAY hoped to tackle the non-availability of food grains. The scheme supports almost 75 crore beneficiaries. The lockdown had put daily wage earners and workers out of jobs and reduced their purchasing power. The free grains were insurance for food security. This ties in with the larger conversations around PDS becoming a rights-based

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rather than a welfare-based approach. However, the larger problems surrounding the awareness of individuals, leakages that plague the PDS, diversion of foodgrains, improper and incomplete identification of beneficiaries, and a general lack of monitoring and accountability remained.

Food security via the PDS is possible only through effective implementation. In a time of declining availability of food grains and access due to a fall in income levels, the government scheme has the potential to ensure food security. Thus, measuring its impact in Chhattisgarh is a fruitful exercise. According to the Yale Economic Growth Center, 99% of PDS were shops open, 92 - 99% had adequate supplies and 99% provided free allotments to citizens in the state. Chhattisgarh extended an additional food kit to all NFSA and Annapurna card holders, those disabled and destitute; this included the NFSA rice (Chhattisgarh's staple diet) being provided for free for two months. The question we hope to answer through this paper is: does the Pradhan Mantri Garib Kalyan Ann Yojana, which guarantees households 5 kilograms of free rice or wheat and 1 kilogram of pulses, improves food security in Chhattisgarh?

Literature Review

The PDS is a center-state scheme. The Center handles the procurement, storage, and allocation of grains to states, while the states are responsible for identifying beneficiaries and implementation. Khera (2011) and Dreze and Khera (2015) note the vast disparities between states in terms of PDS leakages. At the same time, the Food and Agriculture Organization noted that India's bumper wheat harvest was affected due to a shortage of labor and transportation, as were vegetables and fish, which affected the food availability.

In Kenya, the introduction of government measures reduced the percentage of households below the daily threshold from 3.32 percentage points to 1.26 percentage points. They also find that rural households witness a larger change in their caloric intake. Harris et al. (2020) evaluate the impact of the pandemic on vegetable producers and a majority reported a decline in sales, prices, and income. 62% of these households had to change their diets; per Bennett's Law, most preserved their staple intake but witnessed a fall in fruit and animal sources (other than dairy). An Inter-Agency Group researched food security in Odisha and found that over 50% of households reported insufficient food availability, with lack of adequate funds being the primary reason. Two-thirds of the households reported that the PDS was a major source of support to meet the food shortage. In UP, there was a 41% increase in food security between December 2019 and September 2020, and the coping strategy was to reduce non-food expenditure.

Roy et al. (2021) analyze the scheme's impact in Bihar, Eastern Uttar Pradesh, and Odisha. We agree that while the cereal provision is adequate since it tops up the existing entitlements to families, the 1kg of pulses will be insufficient as most households consume between 4 - 5kgs of pulses a month. The pandemic caused large supply chain issues and inflation, thus, making it hard for households to have a diversified and adequate diet. They find that since entitlements are per-capita, those with bigger families win while smaller families lose out and almost a third of the population is unaware of their entitlements. Even before the pandemic, a majority of the households were supplementing their PDS grains through market purchases, with the driving reason being the insufficient quantity of rice being distributed. This could be because

Appendix

Simple Regression Results

December 2019

```
. use "D:\Ashu\Ashoka Semesters\Sem 6\Food Security\Data\Weighted data\December2019_CH_Weighted.dta"

. regress total_expenditure monthly_expense_on_food monthly_expense_on_education monthly_expense_on_recreatior
>  monthly_expense_on_health
```

Source	SS	df	MS		
				Number of obs	= 4,799
				F(4, 4794)	= 1219.13
Model	8.3448e+11	4	2.0862e+11	Prob > F	= 0.0000
Residual	8.2036e+11	4,794	171122024	R-squared	= 0.5043
				Adj R-squared	= 0.5039
Total	1.6548e+12	4,798	344901370	Root MSE	= 13081

total_expenditure	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
monthly_expense_on_food	1.129497	.0243961	46.30	0.000	1.08167	1.177325
monthly_expense_on_education	1.014314	.0244945	41.41	0.000	.9662938	1.062335
monthly_expense_on_recreation	11.14788	1.059575	10.52	0.000	9.070625	13.22513
monthly_expense_on_health	4.307042	.4489498	9.59	0.000	3.426895	5.18719
_cons	3227.27	219.8247	14.68	0.000	2796.313	3658.227

April 2020

```
. use "D:\Ashu\Ashoka Semesters\Sem 6\Food Security\Data\Weighted data\April2020_CH_Weighted.dta"

. regress total_expenditure monthly_expense_on_food monthly_expense_on_education monthly_expense_on_recreation
>  monthly_expense_on_health

      Source |       SS           df       MS      Number of obs   =     4,799
-------------+----------------------------------   F(4, 4794)      =  39940.38
       Model |  3.3316e+10         4  8.3291e+09   Prob > F        =    0.0000
    Residual |   999730322     4,794  208537.823   R-squared       =    0.9709
-------------+----------------------------------   Adj R-squared   =    0.9708
       Total |  3.4316e+10     4,798  7152157.74   Root MSE        =    456.66

------------------------------------------------------------------------------
total_expenditure | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
------------------+-----------------------------------------------------------
monthly_expense_on_food |   1.701835   .0143145   118.89   0.000     1.673772   1.729898
monthly_expense_on_education |   2.056005   .1396005    14.73   0.000     1.782324   2.329686
monthly_expense_on_recreation |   2.078624   .4347632     4.78   0.000     1.226289    2.93096
monthly_expense_on_health |   .6292056   .0989472     6.36   0.000     .4352237   .8231875
            _cons |   538.8229    39.2987    13.71   0.000     461.7794   615.8664
------------------------------------------------------------------------------
```

March 2020

```
. use "D:\Ashu\Ashoka Semesters\Sem 6\Food Security\Data\Weighted data\March2021_CH_Weighted.dta"

. regress total_expenditure monthly_expense_on_food monthly_expense_on_education monthly_expense_on_recreation
>  monthly_expense_on_health

      Source |       SS           df       MS      Number of obs   =     4,799
-------------+----------------------------------   F(4, 4794)      =   9797.28
       Model |  2.2134e+11         4  5.5334e+10   Prob > F        =    0.0000
    Residual |  2.7076e+10     4,794  5647900.45   R-squared       =    0.8910
-------------+----------------------------------   Adj R-squared   =    0.8909
       Total |  2.4841e+11     4,798  51774115.6   Root MSE        =    2376.5

------------------------------------------------------------------------------
total_expenditure | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
------------------+-----------------------------------------------------------
monthly_expense_on_food |    2.03873   .0188606   108.09   0.000     2.001755   2.075706
monthly_expense_on_education |   3.485874   .1052643    33.12   0.000     3.279508    3.69224
monthly_expense_on_recreation |   2.608995   .5068638     5.15   0.000      1.61531   3.602681
monthly_expense_on_health |    2.79065   .1150187    24.26   0.000     2.565161    3.01614
            _cons |   1065.651   63.37927    16.81   0.000     941.3986   1189.904
------------------------------------------------------------------------------
```

October 2021

```
. use "D:\Ashu\Ashoka Semesters\Sem 6\Food Security\Data\Weighted data\October2021_CH_Weighted.dta"

. regress total_expenditure monthly_expense_on_food monthly_expense_on_education monthly_expense_on_recreation
>  monthly_expense_on_health

      Source |       SS           df       MS      Number of obs   =     4,799
-------------+----------------------------------   F(4, 4794)      =   7484.86
       Model |  1.9199e+11         4  4.7997e+10   Prob > F        =    0.0000
    Residual |  3.0742e+10     4,794  6412550.04   R-squared       =    0.8620
-------------+----------------------------------   Adj R-squared   =    0.8619
       Total |  2.2273e+11     4,798  46421401.7   Root MSE        =    2532.3

------------------------------------------------------------------------------
total_expenditure | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
------------------+-----------------------------------------------------------
monthly_expense_on_food |   1.905212   .0160223   118.91   0.000     1.873801   1.936623
monthly_expense_on_education |    2.18386   .0578713    37.74   0.000     2.070406   2.297314
monthly_expense_on_recreation |   4.332962   .5370139     8.07   0.000     3.280168   5.385755
monthly_expense_on_health |   2.943455   .1138028    25.86   0.000     2.720349    3.16656
            _cons |   1445.629   72.99815    19.80   0.000     1302.519   1588.739
------------------------------------------------------------------------------
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household members had not been accounted for on the ration card due to delays in updates, and when allotment is per capita, this becomes important. They conclude that while the PDS delivers, the non-pandemic problems of choice constraint and exclusion persist.

Krishnamurthy et al. (2014) evaluate the impact of NFSA on food security in Chhattisgarh due to the reforms carried out in the state. They found a 400% increase in the consumption of PDS entitlements. The districts also increased their consumption of non-grains like pulses, animal-based protein, and produce by 13 percentage points. The relative increase in pulses was greater than other non-gain groups. This is because Chhattisgarh is a poor state with close to 30% of its population living below the poverty line, and they choose cheaper sources of non-grains before substituting towards more expensive means like meat. They also show that since the PDS rice consumption has increased over the years, grain consumption (relative to non-grains) has risen. Between 2007 and 2011, malnutrition in the state fell by 16%. The state government attributes it to the successful implementation of the PDS that allows money to be saved and opens the option to supplement via market purchases.

The pandemic is a severe negative income shock. The International Labor Organization predicted that the pandemic would push 400 million Indians into poverty. The demand for employment under the National Rural Employment Guarantee Act also rose in the first few months of the lockdown, almost double the average between 2013 - 19. Block et al. (2004) analyze the impact of the Indonesian Financial Crisis of 1997 on children's nutritional outcomes. They found that intake of micronutrient-rich food substantially declined, reversed a 20-years of nutritional improvement, and the prevalence of anemia in mothers and children increased.

The cereal price index tripled between 2000 and 2008 (the Great Financial Crisis). Brinkman et al. (2010) assess the impact of crises on food consumption and diet diversity. They conclude that crises lead to a reduction in the quality and quantity of food consumed. Vulnerable groups will shift to cereals, food that gives them enough calories but not nutrients. Most farm-holdings in India are small, resulting in farmers being net buyers. The authors believe that such households will be adversely affected by high food prices, especially if they sell at low prices but purchase at higher prices in the lean season.

The role played by PDS is extremely crucial during a crisis. This is in line with Hoynes and Schanzenbach (2009), who evaluated the Food Stamp Scheme in the United States. It was the largest income transfer program for low-income populations, costing the government $27billion. The scheme leads to a reduction in out-of-pocket food expenditure and an increase in overall food expenditure. Given that food expenditure is positively related to food consumption, food consumption will rise too. We expect this to play out in Chhattisgarh as well.

Material

We use data from the Consumer Pyramids Household Survey collected by the Center for Monitoring Indian Economy. They collect information on expenditure (in rupees) rather than quantity and work on the assumption that consumption expenditure is an effective proxy for consumption. Data from December 2019 provides us with our baseline estimate as it is the pre-pandemic level, April 2020 helps us examine the immediate impact of the pandemic, March 2021 presents the impact a year after the government first implemented the policy, and October 2021 is the medium-term impact after 1.5 years. We have retained most variables in their original form. The only new variables created were composite variables for beverages, sweets, and meat consumption. This was done after verifying that when subcomponents were summed, they gave the composite variable. This allows us to examine the impact on food groups comprehensively.

Caveats of the data include the unavailability of income data which doesn't allow us to examine what proportion of the income is being consumed versus saved. Secondly, since the data accounts for consumption expenditure, we cannot discern the impact of inflation on the quantities. Lastly, we are examining the impact of PDS alone on food security; unlike the IHDS data, CMIE doesn't provide the breakdown of the source of the cereals and pulses, and no reliable source could be found for how much of the consumption is via the PDS. We presume that since the rice subsidy is large, the entirety of consumption for cereals will be met via the PDS and partially for pulses. Lastly, India also introduced certain cash transfers, which would have increased income and could distort consumer behavior.

Method

We are running a regression equation to estimate the effects of changes in consumption expenditure across different groups on the total consumption expenditure of a household.

Our coefficient of interest is β_2, which reflects the relationship between total monthly expenditure and monthly expenditure on food. We believe that β_2 will be positive due to the low elasticity of food expenditure even if the incomes are falling. At the same time, we expect expenditure on education, recreation, and health to fall. However, this doesn't reflect the changes in the dietary composition of household diets. We use the CMIE data to run the regression and evaluate the changes in individual food groups. We realize a bias in the data set on tabulating the data because there is a significantly greater number of observations for urban households. However, in reality, Chhattisgarh is predominantly rural and the sample wouldn't be representative of the population. We weight the data using household sizes to control for this, assuming that rural households tend to be bigger.

Results

All the coefficients are positive and significant at a 95% confidence interval from the baseline regression. Further, all the independent variables are positively correlated with the

total expenditure. There is a sharp increase in the expenditure share of food in April 2020, which coincides with the imposition of the national lockdown in India. This can be attributed to the fall in incomes due to loss in employment. We hypothesize that this increase in food expenditure was due to a shift away from health, education, and recreation. Within food expenditure, we expect substitution away from nutrition towards maintaining caloric intake. This would result in increased cereal consumption. Table 2 indicates that the coefficient of monthly expense on cereal doesn't rise over time but remains positive and significant across the months. There is a decrease in cereals' mean food budget share between December 2019 and April 2020 (Figure II). This could be because the PDS supplies the majority of the household's needs. We believe this could be because of the scheme being implemented and its tangible impact being felt by households.

Table 1: Simple Regression's Coefficients Over the Months.

Monthly Expense On	Coefficient of variables for regression			
	December 2019	April 2020	March 2021	October 2021
Food	1.13	1.70	2.04	1.91
Education	1.01	2.06	3.49	2.18
Recreation	11.15	2.08	2.61	4.33
Heath	4.31	0.63	2.79	2.94
Constant	3227.27	538.82	1065.65	1445.63

Table 2: Detailed Regression's Coefficients Over the Months.

Monthly Expense On	Coefficient of variables for regression			
	December 2019	April 2020	March 2021	October 2021
Cereals whole	3.35	2.96	1.84	4.82
Pulses	2.67	-0.44	0.73	0.55
Vegetables	2.58	1.95	2.87	5.03
Milk and milk products	10.29	2.34	9.98	1.22
Food in restaurants	3.98	1.15	7.19	-1.28
Recreation	4.86	-3.47	0.20	2.08
Cooking fuel	0.38	1.02	0.90	1.66
Education	1.00	1.27	2.44	1.85
Health	1.28	1.07	1.77	1.63
Oils and fats	-5.91	1.31	1.27	-2.72
Non-veg	4.92	3.45	0.75	1.41
Sweet	-14.60	3.59	-4.26	-0.83
Beverages	16.11	-5.69	0.97	2.05
Constant	4371.97	640.78	2438.91	1748.61

Coefficients that are underlined are not statistically significant at the 95% and 99% confidence levels.

Table 3: Mean Monthly Expense on Food and Total Expenditure for Weighted Sample.

Month	Mean Monthly Expense on Food	Mean Monthly Total Expenditure	Mean Expenditure Share of Food (base December 2019)	Change in Mean Expenditure Share of Food
Dec-19	3483.19	8682.52	40.12%	0%
Apr-20	773.50	1549.08	49.93%	24.47%
Mar-21	2390.49	6427.20	37.19%	-7.29%
Oct-21	3917.70	9952.53	39.36%	-1.88%

Table 4: Mean Monthly Expense on Cereals and Food for Weighted Sample.

Month	Mean Monthly Expense on Cereals Whole	Mean Monthly Expense on Food	Mean Food Budget Share on Cereals Whole	Change in Mean Food Budget Share on Cereals Whole (base December 2019)
Dec-19	457.21	3483.19	13.13%	0.00%
Apr-20	58.34	773.50	7.54%	-42.54%
Mar-21	238.34	2390.49	9.97%	-24.04%
Oct-21	412.80	3917.70	10.54%	-19.73%

Table 5: Mean Monthly Expense on Pulses and Food for Weighted Sample.

Month	Mean Monthly Expense on Pulses	Mean Monthly Expense on Food	Mean Food Budget Share on Pulses	Change in Mean Food Budget Share on Pulses (base December 2019)
Dec-19	171.90	3483.19	4.94%	0.00%
Apr-20	-3.49	773.50	-0.45%	-109.14%
Mar-21	120.92	2390.49	5.06%	2.49%
Oct-21	242.31	3917.70	6.19%	25.33%

*The mean expense on pulses is negative for April 2020 because the data has observations where the monthly expenditure on pulses is negative. While negative observations are present for most food groups, they are significantly greater in number for pulses which is giving us a negative mean.

Table 6: Mean Monthly Expense on Health for Weighted Sample.

Month	Mean Monthly Expense on Health	Mean Monthly Total Expenditure	Mean Expenditure Share of Health	Change in Mean Expenditure Share of Health (base December 2019)
Dec-19	217.49	8682.52	2.50%	0.00%
Apr-20	-42.71	1549.08	-2.76%	-210.08%
Mar-21	137.29	6427.20	2.14%	-14.73%
Oct-21	246.43	9952.53	2.48%	-1.16%

Table 7: Mean Monthly Expense on Education for Weighted Sample.

Month	Mean Monthly Expense on Education	Mean Monthly Total Expenditure	Mean Expenditure Share of Education	Change in Mean Expenditure Share of Education (base December 2019)
Dec-19	362.78	8682.52	4.18%	0.00%
Apr-20	-66.17	1549.08	-4.27%	-202.23%
Mar-21	57.15	6427.20	0.89%	-78.72%
Oct-21	164.34	9952.53	1.65%	-60.48%

Table 2 shows a negative correlation between the monthly expenditure on pulses and the total monthly expenditure in April 2020. This is the month when incomes had fallen by the largest. In the first wave, there was a 44% fall in the average all-India monthly per capita household income between February and April 2020. Further, there was a 15.85% increase in inflation in "pulses and products" from March 2019 to March 2020. Table 2 shows that the coefficient for monthly expense on pulses is significant only in April 2020, which could be because of the sudden emphasis on free pulses in PMGKAY. The PDS in Chhattisgarh provided 2kg of pulses to priority households at Rs. 10 or Rs. 5 per kg, depending on the area, but not for free. We notice that the mean consumption expenditure on pulses is negative in April 2020 (Table 5). The percentage of households with negative values in December 2019 was 35.01%, rose to 69.76% in

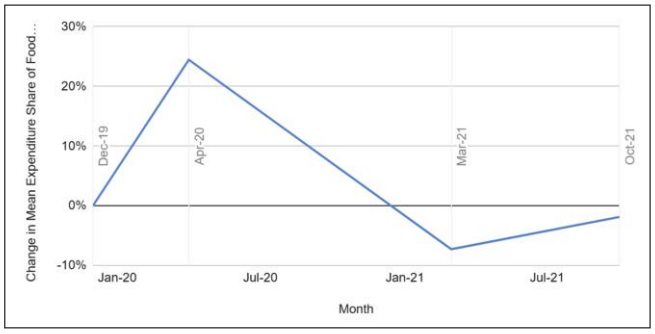

Figure 1: Change in Mean Expenditure Share of Food.

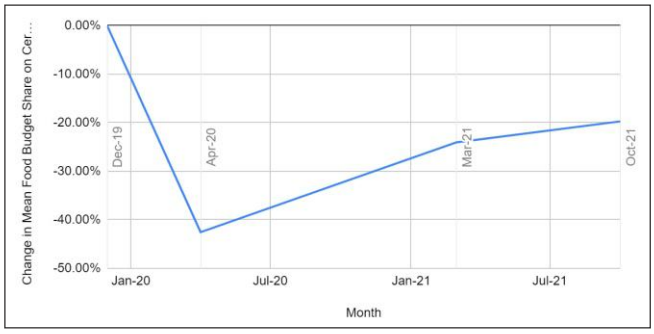

Figure 2: Change in Mean Expenditure Share of Cereals.

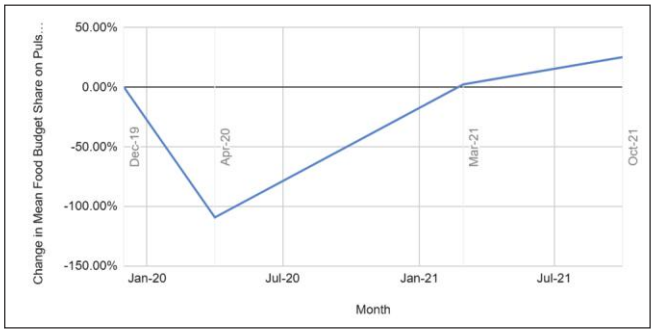

Figure 3: Change in Mean Expenditure Share of Pulses.

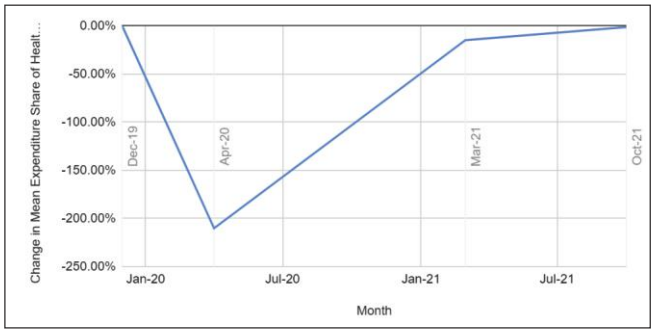

Figure 4: Change in Mean Expenditure Share of Health.

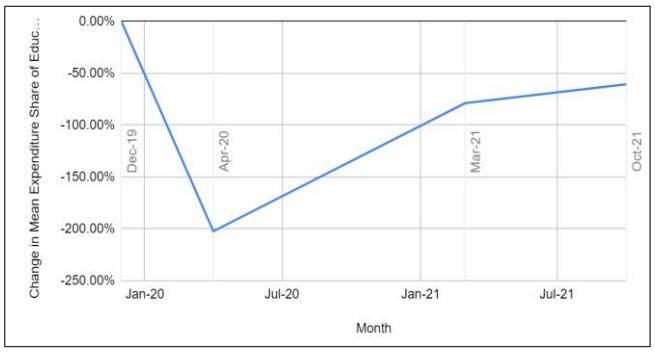

Figure 5: Change in Mean Expenditure Share of Education.

April 2020, came down to 45.20% in March 2021, and fell to 16.92% in October 2021. This immediate increase in the proportion of households availing subsidies can be attributed to the national lockdown, while the gradual fall coincides with the economy recovering and incomes rising.

Table 2 shows that the coefficient of milk and milk products comes down drastically from December 2019 to April 2020 from 10.29 to 2.34. This seems to be the direct result of the pandemic which impacted the country. Interestingly, the coefficient recovered to 9.98 in March 2021, as the incomes would have recovered post the pandemic. The per capita household incomes were just 3% lower than the pre-pandemic level of February 2020. However, the coefficient again goes down to 1.22 between March 2021 and October 2021. Incomes fell again before a recovery happened as India faced the severe second wave of the pandemic from February 2021. India's per capita income fell by 19% between January and May 2021. A negative correlation is observed for monthly expenditure on monthly expenditure on beverages.

We observe a 210% fall in the mean expenditure share of health in April 2020 compared to December 2019 (Table 6). During a health crisis, the expenditure share on health might go up due to expenses on hospitalization, sanitizers, and facemasks. The decline in expenditure shares of health and education indicates economic distress. This could also reflect reliance on public hospitals instead of private hospitals, due to which the household expenses didn't go up. As reflected in Figure I, the substitution away from health could be towards food. The model regression's coefficients support this.

We observe a decline in the mean expenditure share on education with the onset of the pandemic (Table 7). This is expected because households will substitute for necessities. The fall could also be attributed to the closure of schools and reduced out-of-pocket expenditure on education. This is expected to impact the long-run labor market outcomes and economic development. The affected students face long-term losses in income. This is because loss in schooling has direct consequences for the cognitive and socio-economic development of the affected children, which affects their job prospects. Further, economies would face lower economic growth due to a less skilled labor force. In addition, this can be expected to have a danger of further increasing future inequality in society.

The question of efficacy of PDS to meet nutritional requirements is age-old. A survey conducted by MicroSaveConsulting in August 2019 found that PDS accounts for about 40% of an average beneficiary's monthly food grain consumption at the household level. However, it found that most beneficiaries had low levels of basic macro and micronutrients, including protein, fat, calcium, iron and folic acid. One can conclude that the PDS has not improved

the nutritional requirements and the primary reason seems to be the lack of dietary diversity. However, the other argument is that the PDS leads to savings for the households by providing them cereals at a subsidized rate. The households can use these savings to expand their dietary diversity to include more non-cereal foods and improve nutritional outcomes. Despite this reasoning, there is prevalence of nutritional deficiencies amongst the beneficiaries and it makes the case for non-cereal foods to be introduced in PDS. On analyzing our data, we see that the coefficient for monthly expenses on vegetables increases, while it falls for milk and milk products, non-vegetarian food, and beverages (Table 2). This could imply a fall in dietary diversity. This can be attributed to the government's focus on ensuring hunger eradication as opposed to meeting nutritional needs.

Limitations

The first limitation of the data is that CPHS is a self-reported survey. It is subject to a reporting bias. While CMIE tries to control for recollection by conducting monthly surveys, we aren't using those estimates for uniformity concerns. Secondly, our analysis has established a correlation between the variables but not causality. This means our relationships could be bidirectional. Lastly, we believe the data is not adequately weighted to be representative of the population. We say this because data is systematically unavailable for household sizes across all four months. We notice that the proportion of households with greater than four members is the same across rural and urban areas. This also indicates a problem in data collection itself– the number of missing values is as high as 73% in the rural areas for April 2020. Therefore, our data might have an urban bias.

Conclusion

The livelihoods survey by Azim Premji University found that 77% of households were eating less during the lockdown than before. This situation has persisted even months after the lockdown for 60% of the households. Our paper has shown that the expenditure on food has increased after the pandemic above the pre-pandemic levels. As concluded in our results section, dietary diversity has reduced with only the coefficient of monthly cereal expenditure rising. The increase in food expenditure could be because the large exclusion errors associated with PDS have forced people to spend more to keep up previous caloric intake levels through non-cereal sources, but the dietary diversity hasn't reached pre-pandemic levels. Within Chhattisgarh, 31% of the population doesn't possess NFSA ration cards and wouldn't have been able to access PMGKAY. The additional demand (of approximately 32 million tons) generated by the scheme is being met by the excess procurement, which was at an unprecedented level of 42.3 million tons of wheat and 55.4 million tons of rice by the Food Corporation of India. During the pandemic, as Bhalla et al. (2022) point out, India's food subsidy expanded to provide the basic ration required by a household to over two-thirds of its population and was important in providing income in the form of food subsidies to households, allowing them maintaining intake through the PDS and diversify by spending in the open market. However, while PMGKAY ensures the food availability and access pillars of food security, the nutrition outcome of a cereals-focused food safety net is detrimental.

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The regression results have been added in the appendix.

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