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Who was impacted and how? The COVID-19 pandemic and the long uneven recovery in India

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Abstract: We investigate the impact of the COVID-19 pandemic on income levels, poverty, and inequality in both the immediate aftermath and during the uneven recovery until December 2021 using high-frequency household survey data from India. We find that the average household incomes dropped sharply during the months of the nationwide lockdown. The subsequent recovery remained incomplete and was unevenly spread over the population even 22 months after the start of the pandemic. Poverty more than doubled during the lockdown and even after almost two years was slightly higher than before the pandemic. Inequality spiked during the lockdown but returned back to pre-pandemic levels. Using an event study model, we find that the initial shock of the lockdown was more severe for the bottom of the income distribution, but it experienced a faster recovery. On the other hand, the top end of the distribution experienced smaller declines and slower recovery. Levels of formality and contact intensiveness of occupations of people across the distribution help explain this uneven impact and recovery.

Key words: COVID-19, poverty, inequality, income distribution, India

JEL classification: D6, D63, I3, O15

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Note: tables and figures at the end of the paper

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1 Introduction

The COVID-19 pandemic has had a significant impact on economic activity worldwide on two accounts—one, on account of the health crisis itself, and two, as a fallout of the various containment measures imposed across the different economies (Narayan et al. 2022; Miguel and Mobarak 2021; Egger et al. 2021). The distributional impact of the pandemic in developing countries has been estimated using growth projections (Sumner et al. 2020; Deaton 2021; Decerf et al. 2021; Mahler et al. 2020), simulations (Alkire et al. 2021), nightlights (Beyer et al. 2021), and models applied on data collected from high-frequency phone surveys (Narayan et al. 2022) or purposive surveys (Kesar et al. 2021; Jaacks et al. 2021; Mahmud and Riley 2021). However, all of the above methods have serious shortcomings in accurately estimating the impact of the pandemic on different sections of the population. Because of the highly infectious nature of the pandemic, a collection of high-frequency, nationally representative livelihoods and income data through household surveys has been difficult and thus rare, especially in developing countries. In addition, although the initial impact of the containment measures (lockdowns) is well understood, the subsequent nature of the recovery and its distributional impacts have not been explored enough.

In this paper we investigate the impact of the pandemic on the distribution of income, poverty, and inequality in India using high-frequency longitudinal data. In particular, we investigate the impact of the pandemic-led containment measures and the nature of the subsequent recovery over almost two years[1] since the start of the pandemic. We examine who was impacted and how by analyzing the impact and recovery across various groupings and tracing the changes in income over the period January 2018 to December 2021.

We estimate poverty and inequality during the pre-pandemic period (January 2019 to February 2020), the lockdown period[2] (March 2020 to May 2020), the post-lockdown period (June 2020 to March 2021), the second wave (April 2021 to June 2021), and the post-second wave period (July 2021 to December 2021) in India. We use the Consumer Pyramids Household Survey (CPHS) collected by the private agency Centre for Monitoring Indian Economy (CMIE). Using an event study framework, we also estimate the change in monthly per capita household income in each month for each income decile as compared to two baselines—one, compared to pre-pandemic levels (February 2020) and, two, compared to the counterfactual income had the pandemic not occurred. Our analysis controls for all time-invariant household characteristics. We also examine the occupational channel through which the distributional impact of the pandemic is operating. We undertake extensive heterogeneity analysis to determine how the drop and recovery in incomes vary by different socio-economic groups—caste identity, religion, human development index (HDI) of states, and percentage of migrant populations in states.[3]

Our first set of findings show that there was a sharp drop in incomes during the lockdown, and incomes have not recovered fully, leading to elevated poverty levels even 22 months after the start of the pandemic. Inequality increased during the lockdown but thereafter began to lower and has returned to pre-pandemic levels in the post-second wave phase. Inequality as measured by the Gini index spiked

[1] We cover 22 months from March 2020 to December 2021.

[2] In this paper, unless otherwise mentioned, lockdown refers to the first nationwide lockdown imposed on 24 March 2020.

[3] The choice of these groupings comes from a characterization of households on the basis of their *pre-pandemic* features. We purposefully do not use any feature of the pandemic itself for doing heterogeneity analysis (e.g., severity of the spread of the pandemic, deaths due to the pandemic, strictness of containment measures). This is out of the scope of this paper primarily because of lack of good-quality, reliable data offering these categorizations. For example, infection rates vary across states not just because of the extent of the spread of the disease but also because of the differential testing policies and infrastructure in the states. Death rates are unreliable because of the varying level of under-reporting of deaths across various states. Strictness of containment measures is dependent both on spread and policy at the state level.

from 0.44 (0.41) to 0.51 (0.46) during the lockdown period and returned to 0.44 (0.37) in the post-second wave period in the rural (urban) sector. An average individual in a rural household lost 30 per cent of their cumulative income during the three months of lockdown compared to the pre-pandemic period. The corresponding loss in cumulative incomes for an individual in an urban household was 37 per cent. In the post-lockdown period, an average individual's cumulative income in a rural (urban) household continued to remain 16 (19) per cent lower than the pre-pandemic period.The second wave led to a sharp drop in incomes for a month, after which they recovered. By the end of 2021, incomes in rural areas had recovered to pre-pandemic levels but in urban areas were still 10 per cent below February 2020 levels. The entire income distribution shifted leftwards. There was more than a twofold increase in poverty during the nationwide lockdown.[4] The percentage of individuals living in households that earn below the national minimum wage on a per capita basis increased from 33 (18) per cent before the pandemic to 62 (56) per cent during the lockdown in rural (urban) areas. The recovery is only partial even about two years since the lockdown was lifted. Even in the post-second wave period the poverty rate was 36 (24) per cent in the rural (urban) areas.

Our second major finding is that the lower part of the distribution witnessed larger drops in their income in the lockdown period but experienced relatively quicker recovery. On the other hand, the upper end of the distribution witnessed smaller initial decline in income during the lockdown and were slow to recover back to pre-pandemic levels. The bottom 20 per cent lost almost their entire income during the lockdown and bounced back rapidly afterwards. The top of the distribution experienced smaller initial shock during the lockdown (between 10 and 20 per cent), but their recovery was lagged. The top decile in every month, especially in the urban areas, stagnated, remaining 14 per cent below their pre-pandemic levels in December 2021. This pattern across the distribution can be explained by how different occupations were impacted by the lockdown and the subsequent economic downturn. Contact-intensive and less secure occupations like wage labourers were impacted severely in the lockdown. These occupations lost jobs due to the largely informal nature of their work and lack of any secure contract and had a sharp drop in incomes. When the economy opened, they were able to recover their lost jobs and earnings. In any typical month, such workers are more populous in the lower end of the income distribution; hence, the lower part of the distribution witnessed the sharp dip and sharp recovery pattern. On the other hand, more formal occupations are less contact-intensive and have some job security so were slightly protected from the impact of national lockdown. They experienced smaller drops in income in the immediate aftermath of the pandemic, but they also saw a slower recovery back. The slow recovery being potentially on account of the longer procedures involved in rehiring workers in such occupations or the lag in recovery after a pay cut, unlike those in daily wage work, for example. Workers belonging to such formal occupation types typically belong to the upper end of the income distribution. We provide evidence to substantiate this theory.

The third major finding is the suggestive evidence that the containment measures (lockdown) had a far greater impact on economic activity than the self-imposed behavioural changes due to fear of the spread of the disease itself. The nationwide lockdown between March 2020 and May 2020 saw a more than 30 per cent decline in incomes on average with the poor losing almost their entire income. In contrast, the drop in incomes during the peaks of the two waves[5] was of a much smaller magnitude, and the recovery was quick as these periods were not accompanied by national lockdown.

All these results are robust to different assumptions and alternate specifications. Poverty increase is observed across different poverty lines, and inequality changes are observed across different inequality

[4] Migration of individuals might have some impact on poverty estimates, but we do not have data to account for that and believe that impact would be small compared to the overall increase. The major impact might be of reduced remittances.

[5] The first wave peaked in September 2020. The second wave, which had a far more devastating impact in terms of human lives, peaked in April–May 2021.

measures. The pattern of changes in incomes across the various deciles is qualitatively similar across different specifications. The results remain similar with and without adjustments to monthly incomes for seasonality. Across different heterogeneous groupings, we find that the disadvantaged groups were impacted more.

Our analysis has implications on both fiscal and welfare policies. We find that complete lockdowns have had a far more deleterious impact on the poor than the rich. Even though the poor, on average, experienced a quick partial recovery, the economic impact borne by them was not of a temporary nature. With low (often zero) savings and mostly informal sources of borrowing, even full recovery of monthly income does not necessarily translate into an overall full recovery back to pre-pandemic levels. The sudden, overnight shock of the lockdown led people to liquidate their assets and incur heavy borrowing for daily sustenance, which in turn implied that they continue to suffer a prolonged effect of the pandemic (Nath et al. 2022). Consequently, there remains an urgent need for providing direct support to tackle food insecurity as well as to assist the poor to enable them to sustain themselves (Sinha 2021; Dreze and Somanchi 2021a; Mishra and Rampal 2020). Our findings also build a case for better funding and further expansion of both rural and urban job schemes in the country (Dhingra and Machin 2020; Basole 2021).

There have been several concerns raised about the CMIE-CPHS sample and data collection process (Dreze and Somanchi 2021b; Somanchi 2021; Pais and Rawal 2021; Sinha Roy and Van Der Weide 2022). One of these concerns is that the CPHS systematically misses sampling the very poor (Somanchi 2021), and its earnings distribution starts at higher income levels compared to other nationally representative surveys (Jha and Basole 2022). We argue that even in the presence of these concerns, their most likely implication would be that our results are conservative estimates of the extent of poverty and inequality changes.

Our results are similar to those obtained from other poverty estimations that find a substantial increase in poverty across the developing world (Sumner et al. 2020; Narayan et al. 2022; Egger et al. 2021; Bottan et al. 2020) and specifically in India (Pew Research Center 2022; Basole et al. 2021). Several smaller surveys in India also find the informal sector was impacted severely during the pandemic (Kesar et al. 2021; Ceballos et al. 2020), and this too is indicative of a subsequent rise in poverty.

Gupta et al. (2021) use CPHS data to study inequality and poverty in India during the pandemic. Their findings are substantially different from ours. They classify households into quartiles based on 2015–19 incomes, and then these static (fixed) quartiles are tracked over the pandemic. So the change in incomes of the households are tracked over time. We, on the other hand, assign households to deciles base on each month's income. So households in our analysis could be assigned to different deciles based on their month's income. We track the decile incomes over time. Gupta et al. (2021) claim that inequality *declined* during the pandemic because the households who were deemed rich prior to the pandemic were impacted more than their poorer counterparts. This interpretation is problematic. Income inequality may be broadly defined as how unevenly incomes are distributed across the population and is usually measured using some measures of inequality like Gini or Theil index or ratios of income of the various quantiles of the distribution. According to all these measures, inequality spiked during the lockdown and has now returned to pre-pandemic levels—*not* substantially declined. Their finding of progressive change, as the authors argue, might have occurred due to upward social mobility during the pandemic. But since mobility and inequality are two different concepts, it is incorrect to interpret it as a fall in inequality.

Tracking households allows one to study mobility over time and derive richer results, but sample attrition needs to be handled with care. This is particularly the case with CPHS data during the lockdown and the period of the pandemic. CPHS interviews moved from in-person to on-phone in the beginning of the lockdown, and the response rate of the subset of households that were contacted fell to roughly 60

per cent, with the responding households constituting roughly 35 per cent of the full sample during the lockdown. The bias resulting from this might impact the results, which has not been systematically investigated by the authors.[6]

Our work contributes to multiple strands of literature. First, we contribute to the literature on the impact of the pandemic on incomes, poverty, and inequality in developing countries (Narayan et al. 2022; Sumner et al. 2020; Reddy 2021; Rönkkö et al. 2022). Ours is among the few studies to use nationally representative household income data to examine the impact of the pandemic. By investigating the distributional impact of the long and uneven recovery, we stretch the boundaries of the existing work, which focus on the initial lockdown phase but not on the distributional impact during the period of post-lockdown recovery. We also investigate the channel through which the distributional impact operates, that of occupation. Further, we focus on India, which has the largest number of poor in a single country across the world, combined with its large population, and hence has critical implications on global poverty and inequality.

Second, we contribute to the literature on measuring poverty and inequality in India (Sahasranaman and Kumar 2020; Edochie et al. 2022; Sinha Roy and Van Der Weide 2022; Bhalla et al. 2022; Gupta et al. 2021). Since the latest published official household survey dates back to 2011–12, there is considerable uncertainty about recent poverty trends in the country. Our work, even though based on a new and different data set, provides insights into the levels of poverty and inequality in India.[7]

Third, our results provide some insights that contribute to the debate on the right kind of policies that should be implemented during a pandemic. There has been a debate on how to get the right balance between policies that reduce health risks of the disease and those that reduce the economic impact of the containment measures (Schotte et al. 2021; Ray and Subramanian 2020; Robalino 2020). By providing estimates of the economic impact of the national lockdown and containment measures during the second wave,[8] our work adds to this literature, too.

The following section elaborates upon the data used in the study with a detailed discussion of the methodologies adopted for the analysis. Section 3 describes the income trends and cumulative losses over the entire income distribution. Section 4 discusses the implications on inequality and poverty in the pre-pandemic, lockdown, and post-lockdown period, as well as in a counterfactual scenario of no pandemic. Section 5 elaborates on the findings from the event study analysis, focusing on both the impact across income distribution and for different occupation categories. Section 6 gives the event study results from the different heterogeneity groups. Section 7 offers a discussion on the CMIE-CPHS data, briefly describing the recent debate on the data set and what it implies for our findings. Section 8 concludes with a brief summary of the results.

2 Data and methodology

2.1 Data description

The survey response rate was high prior to the pandemic but dropped significantly during the lockdown and has only partly recovered. The response rate of the survey was 84 per cent in 2019. This dropped to a

[6] It is partly for this reason that we classify households into deciles based on each month's income (dynamically), whereas Gupta et al. (2021) define quantiles based on the average 2015–19 incomes and then track those households.

[7] Poverty and inequality levels in NSS or IHDS data are not directly comparable to CPHS data because the sampling and survey methodology are substantially different.

[8] Only partial lockdowns were imposed during the second wave.

low of 44 per cent during the wave that included the lockdown months (May 2020 to August 2020). The response rate has fluctuated between 65 and 75 per cent since then. The survey was conducted only on the phone between the end of March 2020 and mid-June 2020. Phone surveys could lead to a downward bias in the reported incomes due to survey fatigue. Part of the large decline in incomes we find during the lockdown might be because of this bias. Abate et al. (2021) find in an experiment in urban Ethiopia that respondents' phone surveys led to lower consumption reporting compared to in-person surveys.

CPHS provides household and individual-level data under four groups: income, consumption, people of India, and aspirational India, starting in 2014. In each visit, income information at the household as well as the individual level is asked about for the previous four months. So in total, CPHS provides income information for every month and for every individual. The variable used for the income analysis in this study is per capita household income. This comprises all kinds of earnings, including wages, business income,[9] rent, private transfers, income from self-production, overtime, bonus, pension, dividends, interest, deposit provident funds, public provident funds, and insurance. It sums up the incomes earned by every member of the household along with those that are attributed to the house itself and not necessarily individuals in the household. All incomes reported in the paper are in constant January 2020 prices.[10]

Occupation information for all members of the household is collected once every four months.[11] CPHS also classifies households based on the occupation composition of the members of the household into 20 distinct categories. We aggregate these categories into seven to eight groupings based on their contact intensiveness and vulnerability to sudden shocks. This is done separately for the rural and urban areas. More details on the categories are in Table A2 in the Appendix.

2.2 Seasonality adjustment

In our analysis, the main results for income are adjusted for seasonality so as to facilitate month-over-month comparisons. Rural incomes vary based on harvest seasons, whereas urban areas have limited seasonality associated with festive seasons. Seasonality adjustment factors for each month are estimated by calculating the average deviation in monthly incomes from the trend line experienced in the 2017–19 period. We estimate incomes for each individual month by calculating a moving average of the monthly incomes of the surrounding 10 months (five months prior to the month under consideration; five months post). The observed income in the month is then divided by the estimated income to get a ratio of the deviation from the trend line. This is done for every month's data between June 2017 and September 2019. The month-specific seasonality adjustment factor is then derived by taking an average of all the ratios for a given month over the two-year period. This adjustment is done separately for rural and urban sectors. We then apply this seasonality factor to each month's income in 2020 to get the seasonally adjusted incomes. For example, rural income for January 2019 is estimated by taking an average of monthly incomes five months prior to that month (August 2018 to December 2018) and five months after that month (February 2019 to June 2019). This is then divided by observed income in January 2019 to obtain a ratio of the estimated to observed incomes. Similarly, a corresponding ratio for January 2018 is estimated. January 2019 and January 2018 ratios are then averaged to get a seasonality adjustment factor for the month of January. This factor is then applied to January 2020 and January 2021 incomes. As expected, incomes are found to be more seasonal in the rural areas compared to those in the

[9] CPHS does not include losses in the business owner's income. It is treated as part of the business accounts. Consequently, CPHS does not report negative incomes.

[10] The conversion is done using the consumer price index released by the Reserve Bank of India. We use the General Index for each state, separately for the rural and urban sectors. The general index subsumes all groups, e.g., food and beverage, clothing and footwear, housing (https://dbie.rbi.org.in/DBIE/dbie.rbi?site=home).

[11] CPHS conducts interviews in 'waves', or four-month periods. January–April constitute the first wave in a given year; May–August are the second wave, and September–December form part of the third wave.

urban areas because of lump-sum incomes obtained by farmers when they sell their harvest. Typically, rural incomes for the months of April and October are higher.[12]

2.3 Cumulative analysis

There are expected to be sharp variations in employment and income during the pandemic either because of the pandemic-induced containment measures or the infection rates. This makes it difficult to understand the impact of the pandemic on longer-term welfare outcomes by just looking at the monthly data. To tackle this frequent fluctuation, we aggregate months into different phases and study the average impact on welfare measures like poverty and inequality during these phases. We divide the time period into five phases based on the intensity of the containment measures and the spread of the virus. COVID-19 infection rates and changes in mobility as measured by Google Mobility data for the different phases are shown in Figure 1. The first phase is the pre-pandemic phase from January 2019 to February 2020, which forms our baseline for comparison of the impact. The second phase is the lockdown period from March 2020 to May 2020 when there was a nationwide lockdown. The third phase is the post-lockdown period before the onset of the second wave from June 2020 to March 2021. This period saw the first wave of infections that peaked in September, but economic activity as seen by mobility rates recovered substantially in comparison to the lockdown period. The fourth phase is the second wave from April 2021 to the end of June 2021. This phase witnessed the deadly second wave in which millions across the country lost their lives due to the pandemic. There was no national lockdown imposed during this period, but several local and state governments imposed different containment measures including partial lockdowns. The last phase is the post-second wave period from July 2021 to December 2021. The pandemic eased during this period and mobility slowly returned to its pre-pandemic levels.

We investigate the changes in household income distribution, poverty rates, and inequality during the five phases to understand the welfare impacts of the pandemic and the subsequent recovery.

2.4 Event study

In order to analyse the changes in household incomes during the pandemic period, we perform an event study analysis. The announcement of the national lockdown in March 2020 is the event of interest. The event study regression helps us estimate the change in incomes relative to different benchmarks. The first model compares monthly income to pre-pandemic income (February 2020), and the second model compares each month's actual income to the predicted income in that month, i.e. a counterfactual in the scenario where there was no pandemic.

The first event study model is the following:

$$(y_{it} - \bar{y_\delta})/\bar{y_\delta} = \sum_{\substack{\tau=-26 \\ \tau\neq -1}}^{\tau=21} \beta_\tau . 1[\tau = t - e] + \alpha_i + \varepsilon_{it} \tag{1}$$

wherein,
y_{it} = seasonally adjusted per capita income in real terms for household i in month t for group j
δ = pre-pandemic period (February 2020)
$\bar{y_\delta}$ = seasonally adjusted average per capita income in real terms for households in February 2020
τ = indexed event time (time relative to the month of lockdown—March 2020)
e = base month (March 2020)

[12] Seasonality adjustments are not done at the occupation level so there may still remain some fluctuations in incomes for particular occupations because of the seasonality of incomes.

α_i = household fixed effects
ε_{it} = error term (clustered at the household level)

Equation 1 is used to get the proportionate change in seasonally adjusted real per capita household incomes in month t relative to average group income in February 2020 for households belonging to different heterogeneous groups.[13] Our analysis starts from January 2018 (26 months before the lockdown τ=-26) to December 2021 (21 months after the lockdown τ=21). As is the norm in the event study analysis, we omit the month before the event—February 2020 (τ=-1). The coefficient β_τ measures the proportionate change in income of household i in month τ compared to the average income of households in February 2020. Household fixed effects control for any time-invariant characteristics of the household such as social group identity and location.

The regression is run separately for rural and urban areas. To study the differential impact of the pandemic across the income distribution, we order the households in rural and urban areas separately by per capita household income of each month. Households in each month are then divided into 10 bins—deciles.[14] Each decile is treated as a different group. The regression is run for households belonging to each decile separately to estimate the change in income of each decile. As the households constituting the deciles might change over time, our results should be interpreted as the change in the average income of the decile and not of particular households, since we are not tracking households.

To better understand the patterns of change in incomes, household occupation categories constitute another grouping variable. We run the regression separately for each occupation group to understand how contact-intensive occupations and occupations primarily in informal sectors and formal sectors fared in the pandemic. We do not have a control group in this model, counterfactual to what would have happened in the absence of the pandemic and containment measure as it was a nationwide event, so we do not claim any causality in our analysis. The second model addresses this concern partly by constructing a counterfactual trend of income based on the past. Also, we cannot use our data to separate the impact of the containment measures (lockdown) and the impact of the change in behaviour due to fear of infection.

In the second model, we compare incomes in each month with predicted incomes in a scenario where the pandemic had not occurred. Income predictions for March 2020 onwards are calculated on income patterns between January 2018 and February 2020 using the following equation:

$$y_{it} = \beta_1 * month + \beta_2 * year + \omega_{it} \tag{2}$$

We estimate the coefficients of the above model based on observed income data from January 2018 to February 2020 and then use those coefficients to predict per capita income levels $\hat{y_{it}}$ for every household i in every month t. This is again done for the different groups to which households may belong. $\hat{y_{it}}$ is obtained for each group separately. We then estimate a modified version of Equation 1 where the change in incomes is measured in comparison to the mean of the predicted income for the group ($\hat{y_t}$) instead of mean income levels in February 2020 ($\bar{y_\delta}$). The modified equation is:

$$(y_{it} - \hat{y_t})/\hat{y_t} = \sum_{\substack{\tau=-26 \\ \tau\neq-1}}^{\tau=21} \beta_\tau . 1[\tau = t - e] + \alpha_i + \varepsilon_{it} \tag{3}$$

[13] Groups can refer to all-India, region (rural/urban), income deciles, caste categories, religion, state groupings using HDI, state groupings using migrant population, etc.

[14] These are dynamic deciles as households belonging to them might vary across months based on their income in that month.

where $\hat{y_t}$ = average predicted per capita income in real terms for households for month t.

The procedure to calculate predicted income uses incomes from the last two years to predict the trend and then estimate the predicted income for each month. If we reduce or increase the length of time in the past used to predict incomes, it may change the predicted values. Additionally, if we decide to give more weight to the recent past and less to distant past to predict future incomes, that too may impact the predicted values. Our estimation in Equation 1 compares income to the most recent past before the pandemic, and in Equation 2 we compare incomes to predictions based on long-term income. This provides two different perspectives on the change in income. Both are not perfect counterfactuals but provide a range of counterfactual incomes against which we can compare the pandemic-era incomes.

It is also likely that the impact of the pandemic varies by social groupings and geographical location of the household. Impact might be different by social groups (caste and religion) because groups tend to be concentrated in particular types of occupations that are differentially impacted or access to resources and networks may vary by group identities. Pre-pandemic characteristics of location (states classified according to cross-state migration status and pre-pandemic human development index) of the household may lead to heterogeneous impact because of varying levels of infrastructure and governance. Based on the migrant population, we categorized states into two groups: those with a low percentage of migrants and those with a high percentage.[15] The second categorization of states is according to their Human Development Index (HDI) levels in 2019. Three categories of states are considered: low HDI, medium HDI, and high HDI. [16]

We do not claim causality in the heterogeneity analysis due to endogeneity and other aspects that may also contribute to the differential impact. Instead we use these heterogeneous categories to illustrate the correlations. We conduct the heterogeneity analysis for poverty and the event study analysis.

3 Descriptives

3.1 Trend analysis

Incomes fell sharply for everyone during the pandemic-induced lockdown, the immediate drop being more drastic for the urban sector. The average monthly per capita household income of India was INR5,404 in February 2020. Compared to this immediate pre-pandemic level, the average monthly incomes declined in real terms to INR3,574 in April, a drop of 34 per cent (Figure 2). Because the pandemic and the containment measures had a greater impact on urban economic activities, urban sectors suffered a sharper drop in incomes compared to the rural areas (Figure 2). Income for a family of four in urban areas on average dropped by 47 per cent (INR13,400) between February 2020 and April 2020, while in rural areas the corresponding drop was 24 per cent (INR4,300).

As expected, immediately after lifting the lockdown restrictions, incomes started recovering. A significant portion of the decline had recovered to the pre-pandemic levels by October 2020. All-India incomes increased steadily until January 2021 and, after a minor dip, were above Feburary 2020 levels in April

[15] Low migrant states are Jammu and Kashmir, Bihar, Meghalaya, Nagaland, Uttar Pradesh, Jharkhand, Rajasthan, Assam, Madhya Pradesh, Chhattisgarh, Tripura, Odisha, and West Bengal. High migrant states are Himachal Pradesh, Sikkim, Haryana, Karnataka, NCT of Delhi, Tamil Nadu, Uttarakhand, Andhra Pradesh, Gujarat, Arunachal Pradesh, Punjab, Maharashtra, Kerala, Pondicherry, and Goa.

[16] Low HDI states are Bihar, Chhattisgarh, Jharkhand, Tripura, West Bengal, Madhya, Pradesh, Odisha, Assam, Uttar Pradesh, Rajasthan, Andhra Pradesh, and Meghalaya. Medium HDI states are Gujarat, Maharashtra, Jammu and Kashmir, Karnataka, Arunachal Pradesh, Telangana, Nagaland, and Uttarakhand. High HDI states are Sikkim, Delhi, Goa, Haryana, Himachal Pradesh, Kerala, Puducherry, Punjab, and Tamil Nadu.

2020. Incomes again dropped significantly in May 2021, which coincides with the peak of the second wave of the pandemic in the country. The all-India per capita real household income in May 2021 was 14 per cent lower than the pre-pandemic level (February 2020). The average rural (urban) incomes in May 2021 were 12 (16) per cent below the pre-pandemic level. Incomes recovered rapidly after the second wave and by December 2021 were close to or above the pre-pandemic levels.

An important caveat here is that these incomes have not been adjusted for seasonality and hence may include seasonal fluctuations in income due to harvest or festival season, for example. Incomes, particularly rural incomes, tend to be higher in the harvest months. Seasonally adjusted incomes give a more accurate understanding of the impact and the recovery, so we use seasonally adjusted numbers for the remainder of our analysis. After adjusting for seasonality, the qualitative pattern of the sharp drop in incomes in the lockdown followed by recovery remains the same (Figure A2). The gap in losses between the rural and urban areas narrows significantly after the seasonality adjustment as the relative drop in rural income increases after the adjustment. The seasonally adjusted drop in incomes in the rural areas was 39 per cent between February 2020 and April 2020 compared to the 24 per cent drop in the unadjusted incomes. The corresponding numbers for the urban areas were 51 per cent with the adjustment and 47 per cent without the adjustment for the same period (Figure A2). Further, while the seasonally adjusted incomes in December 2021 were back to pre-pandemic levels for the rural areas, the levels continued to remain around 4 per cent lower than the pre-pandemic levels in the urban areas (Figure A2).

3.2 Cumulative analysis

To understand the aggregate impact of the pandemic on distribution, poverty, and inequality, we estimate them for the five aggregate periods outlined in Section 2.3. Figure 3 plots the per capita household income distributions for the five different periods in rural and urban areas. The distribution moved significantly to the left during the lockdown phase with the mean per capita household incomes declining by 30 per cent in rural areas and 37 per cent in urban areas. Even in the post-lockdown phase, the distribution has not fully recovered to its pre-pandemic state. The average per capita household incomes in the post-lockdown phase were 16 per cent lower in the rural areas and 19 per cent lower in the urban areas, as compared to pre-pandemic levels. The second wave saw a deterioration in conditions for many and the distribution shifted to the left, but incomes were higher than the lockdown phase. The post-second wave period saw a significant recovery. The distribution in rural areas moved right of the pre-pandemic distribution for large portions of the distribution. The urban distribution, especially the top of the distribution, did not experience as strong a recovery and was to the left of the pre-pandemic distribution for most parts. Even when we compare some select pre- and post-pandemic months, it is clear that the distribution has shifted to the left and has not fully recovered (Figure A3).

Plotting the growth incidence curves, we find that the impact was uneven across the distribution in the different phases (Figure 4). The lockdown phase, and to some extent the second wave period, saw lower percentiles experiencing more declines in incomes than the higher percentiles. The lockdown period saw lower average declines in income as one climbed up the income ladder compared to the pre-pandemic period (except for the top 1 per cent in rural areas that experienced a minor increase in income). Almost all income percentiles in urban areas experienced larger drops in income on average during the lockdown period compared to their corresponding rural percentiles.

However, the impact in the two recovery phases (post-lockdown and post-second wave) is similar across large parts of the distribution (Figure 4). The post-lockdown phase witnessed a similar average drop between 15 and 20 per cent across the income distribution in both the rural and urban areas (except for the households in the top and bottom 5 per cent of the distribution). In the post-second wave period, rural areas have recovered better than urban areas across the distribution (except for the bottom 10 per cent). The recovery is similar for most of the middle of the distribution. The top 20 per cent in

urban areas seems to be farthest from complete recovery in the post-second wave period than other percentiles.

4 Poverty and inequality

4.1 Poverty

Poverty increased substantially during the lockdown, then recovered partly in the post-lockdown phase, but experienced a deterioration during the second wave. The post-second wave period saw an improvement in the situation, but on average poverty still was slightly above pre-COVID levels (Table 1).

The proportion of people living in households earning less than the national minimum wage[17] almost doubled in the rural areas and more than tripled in the urban areas during the lockdown. Poverty in the post-lockdown phase was 1.3 (1.6) times higher in rural (urban) areas compared to the pre-pandemic period. Poverty worsened during the second wave but saw an improvement in the post-second wave period in both rural and urban areas. In the post-second wave period, on average, poverty was slightly above the pre-COVID levels, particularly in rural areas.

In the absence of the pandemic, poverty would have declined with economic growth, as has been the case in most pre-pandemic years. But any potential progress in poverty reduction for these two years was wiped out by the pandemic, and during this phase, the situation was worse. This would have led to a dip in savings, if any, and asset sales impacting the long-term productivity and welfare of households.

A similar pattern exists even by different definitions of poverty lines, though the extent varies (Table 1). Even when we compare select months, poverty is still higher than the pre-pandemic months (Table A3).

We find that poverty saw a substantial increase across various groupings by caste, religion, and state groups, but the extent varied. The intermediate caste saw higher increases in poverty during the lockdown phase and recovery was worse than other castes (Table A4). The increase in poverty was highest for the Other religion category (Table A5). States with high HDI saw a significantly larger increase in poverty (Table A6). The proportionate increase in poverty was far higher in all periods in the states that fall in the category of in-migration states compared to out-migration states (Table A7).

4.2 Inequality

We find that inequality increased drastically during the lockdown phase but has largely returned to the pre-pandemic levels after the lockdown. In rural areas, and as per some inequality measures (General Entrophy measures), and in urban areas, inequality levels in the post-second wave period are below those of the pre-COVID period. We estimate different inequality measures—Gini, General Entropy Measures, and a ratio of 90 to 10 per cent—and the results are consistent across these measures (Table 2). The increase in poverty accompanied by no change in inequality in the post-lockdown period indicates that there was a shift in the entire distribution towards lower incomes, as shown in Figure 3. The decline in inequality in the post-second wave period might indicate the slow recovery for the top end of the distribution. Examining inequality for select months also indicates similar qualitative findings of an

[17] We use the definition of the national minimum wage proposed by the Anoop Satpathy committee. The recommendation was INR375 per day (INR104 per capita per day) for rural areas and INR430 (INR119 per capita per day) for urban areas as of July 2018. This works out to INR2,900 per capita per month and INR3,344 per capita per month, respectively, after adjusting for inflation in January 2020 terms. This is also consistent with Indian Labour Commission (ILC) norms and the Supreme Court guidelines.

increase in inequality followed by a decline below pre-COVID levels (Table A8). Household surveys, including CPHS, do not capture the top end of the distribution and hence usually understate the level of inequality. The trends in inequality might also be impacted if the top end of the distribution performs differently than the other parts of the distribution.

5 Event study

To understand the impact of the national lockdown and the pandemic on incomes, we estimate Equation 1 for the rural and urban areas separately. The pandemic and the subsequent lockdown led to a 37 (48) per cent drop in the seasonally adjusted per capita real household income in April 2020 relative to February 2020 in rural (urban) India, controlling for all time invariant household characteristics. Income levels recovered rapidly as the lockdown was relaxed and were 16 per cent (18 per cent) below the pre-pandemic levels in August 2020 in the rural (urban) areas. This was followed by a slow recovery. May 2021 witnessed a sharp drop in incomes in both rural and urban areas, as this was the peak of the deadly second wave of the pandemic. In May 2021, incomes were 23 (26) per cent lower than February 2020 in the rural (urban) areas. But the recovery from this drop was fast—within 1–2 months incomes were back to levels observed before the second wave. There was no national lockdown during the second wave—only state and local containment measures. Even though we cannot separate out impact of lockdown from self-imposed preventative measures, the lower drop and sharper recovery from the second wave compared to the first national lockdown indicates that lockdown might have a larger economic impact than the self-imposed behaviour changes due to the threat of infection. By December 2021, average rural incomes were back to pre-pandemic levels. The urban recovery though was far from complete, with average incomes continuing to be 10 per cent below the pre-pandemic level (Figure 5).

5.1 Impact across the income distribution

We measure the differential impact on different segments of the income distribution by tracing the change in average incomes for each decile in the event study framework for every month vis-a-vis February 2020. Deciles are created using per capita household income for each month, and this analysis helps us track how deciles performed over time.[18]

The pandemic led to a monotonic drop in incomes in April 2020 with a sharper fall in incomes for the bottom two deciles followed by the upper deciles, with the least fall experienced by the top decile. The bottom 20 per cent of urban households lost almost their entire income in April 2020 due to the pandemic, while the top 20 per cent in April 2020 lost between 20 and 30 per cent of their incomes. For the rural households too there was a more than 90 per cent drop in incomes for the bottom two deciles and between 15 and 30 per cent for the top two deciles in April 2020.

The bottom deciles in both rural and urban areas recovered a large portion of the drop experienced during the lockdown by August 2020. The recovery in incomes in both rural and urban areas was the sharpest for the lower deciles starting in June 2020. The top deciles saw the smallest drop in incomes during the lockdown, but their income levels did not recover substantially post-lockdown and until May 2021 remained largely stagnant, sometimes even lower than the initial drop experienced in April 2020. During the second wave in May 2021, almost all deciles experienced a sharp drop—with the drop being

[18] Households are assigned to deciles each month based on their per capita household income. So households might be in Decile 1 in one month and be classified to be in Decile 5 the next month if their relative income increases. Our analysis helps track how decile incomes performed during the pandemic, but we are not tracking a static set of households.

higher in urban areas and for lower deciles. By August 2021, income levels for all deciles, except the top,[19] in both rural and urban areas had recovered back to their pre-pandemic levels[20] (Figure 6).

Across most of the deciles in the urban and rural areas, especially in the year prior to the pandemic, there are no pre-trends, except for the bottom two deciles in rural areas. The change in incomes in the pre-pandemic period is not significantly different across deciles in the urban and rural areas, except for the poorest decile in the rural areas (Figure 6). The change in income level for the bottom decile in the rural sector appears to be highly volatile and has a significant downward pre-trend. The bottom decile had a mean monthly income of INR397 in January 2018. It remained roughly between INR300 and INR500 for every month until the end of 2019. Due to the acutely low levels of income for the bottom decile, even small absolute changes resulted in a large percentage change, which is visible in Figure 6(a). There is also likely to be a larger measurement error when measuring incomes at the bottom.

In addition to estimating the change in income compared to the pre-pandemic income levels (February 2020 income), we also estimate Equation 3 wherein we compare incomes with the predicted incomes in a counterfactual scenario where the pandemic has not occurred. This helps us check the robustness of our findings against an alternative counterfactual. Figure 7 plots the percentage change in seasonally adjusted per capita income vis-a-vis the predicted income.[21] If the decile income trend intersects with the zero line, it means that decile income is the same as the predicted income for that month. If it is below this level, then decile income is less than the predicted income and vice versa. The pattern of decline in income during the lockdown and the immediate recovery is similar to the trends we get when looking at the changes in income compared to February 2020.

The bottom deciles in April and May 2020 experienced larger declines compared to upper deciles in these months, in both rural and urban areas. But in later periods, rural bottom deciles are farthest away from predicted incomes almost throughout the recovery. So they appear to have the worst recovery, but this needs to be read with caution. Rural bottom deciles, and the rural sector as a whole, experienced a large drop in incomes pre-pandemic (starting from September 2019).[22] So they were well below the predicted income (based on the trend line drawn using two-year data) before the pandemic hit. Even though they recovered from the lockdown, they were still far away from the predicted income. The rural bottom decile was 45 per cent below predicted income in Feburary 2019 and had recovered to be 25 per cent below predicted income in December 2021. The rural top decile income in Februrary 2020 was the same as predicted income but about 15 per cent below predicted income in December 2021.

5.2 Impact by occupation categories

The large drops during the lockdown followed by rapid recovery for households in the lower part of the income distribution and smaller drops along with slower recovery for households in the upper end of the income distribution could be explained by the differential impact of the pandemic on the different occupation categories. One hypothesis is that contact-intensive occupations like daily wage work or low-wage service sector jobs were impacted severely during the lockdown and recovered relatively quickly as the economy opened up. These are also jobs where there are no contracts, so firing is easier and employers can rehire easily, too. Households whose members tend to be daily wage workers con-

[19] The top decile in each month in the urban areas did not show any recovery. These deciles continued to remain 15–20 per cent below pre-pandemic levels.

[20] We report the change in income levels for the rural and urban sectors along with their levels of significance in Tables ?? and A10 in the Appendix.

[21] The percentage change in incomes along with their levels of significance are presented in Tables A11 and A12.

[22] This large pre-pandemic drop for the lower part of the distribution could be partly due to poor economic growth during 2019. GDP growth in 2011–12 prices was 3.1 per cent in the last quarter of 2019—the lowest in more than a decade.

stitute the lower deciles. As a result, the lower deciles witnessed a sharp drop and a speedy (partial) recovery.

Jobs that could be done remotely—formal sector jobs like white-collar professionals—were impacted minimally during the lockdown. These are also jobs that have relatively longer contracts so firing can take time; hence, there is some short-term protection. Given the uncertainty surrounding the early part of the pandemic, employers might have been reluctant to fire or lower the wages of such workers immediately. As a result, this group experienced smaller immediate drops and a delayed impact. However, the job or wage losses suffered in these white-collar professions tend to be more permanent as employers are slow to re-hire or increase wages given the uncertainty in economic recovery and pandemic waves. Households whose members are in white-collar professional jobs also tend to earn more and belong to the upper end of the income distribution. Accordingly, the top of the distribution saw a much muted immediate drop, a delayed impact, but slower recovery.

This relationship between occupation categories, the differential impact of the pandemic on the different kinds of occupations, and the association of occupations with household income deciles could help explain the patterns we observe in our decile event study analysis.

We provide evidence to test this hypothesis by first examining the composition of each income quintile by occupation category of households. Next, we estimate the changes in income for households belonging to each occupation category in the event study framework by estimating Equation 1 for each occupation category separately.[23] We have aggregated the occupation categories, to the extent possible, into categories that are more contact-intensive, informal, and less secure and other categories that are less contact-intensive, formal, and with some protections from sudden changes in the contract. The split into categories is not perfect as occupations have multiple characteristics that do not always fit into this characterization.

In the rural areas, wage labourers' and agricultural labourers' jobs are more contact-intensive and more vulnerable to sudden shocks like the lockdown due to the daily nature of the contract. Entrepreneurs, mostly non-agriculture self-employed without any employees, even though they do not have a contract, have businesses that are more contact-intensive and less secure. These three categories are more likely to belong to the bottom quintiles in the rural distribution (Table 3). For example, wage labourers constitute 19 per cent of the population but are 30 per cent of the bottom quintile. Agricultural labourers and entrepreneurs are more likely to be present in quintiles 2–4 compared to being in the top quintile. These groups experienced larger declines during the lockdown (85, 67, and 58 per cent decline in April 2020 for wage, agricultural labour, and entrepreneurs, respectively) compared to other groups. They recovered quickly and by August 2020 were only 4–6 per cent below their February 2020 levels (Table 4). By December 2021, income levels for these three categories of workers were among the closest to pre-pandemic levels.

In the rural areas, the formal job category is mostly concentrated in the top two quintiles (Table 3). Formal jobs are 22 per cent of the top quintile whereas they constitute only 13 per cent of the population. This group experienced substantially smaller declines during the pandemic compared to the wage labourers (40 per cent vs 85 per cent in April 2020) but in August 2020 and January 2021 were further away from full recovery than wage labourers. In December 2021, income levels for formal sector workers were 8 per cent below the pre-pandemic level (Table 4). Farmers (big and small) are not easily classified into these categories as agriculture was exempted from the lockdown and they have no job contracts. They experienced smaller declines during the lockdown and had a volatile recovery.

[23] The occupation categorization used is the categorization reported in each wave of the survey for the household and so might vary across waves for the same household.

In the urban areas, wage labour, agriculture labour, non-technical worker, and entrepreneur (self-employed) categories are more contact-intensive and vulnerable in terms of job contracts. These groups are more likely to be in the bottom quintiles (Table 5). For example, wage labourers are 15 per cent of the overall population but 28 per cent of the bottom quintile. All three groups experienced sharper declines in April 2020 followed by rapid recovery, as compared to the other groups (Table 6). For example, wage labourers' income declined by 75 per cent in April 2020, recovered rapidly to be only 17 per cent below February 2020 levels in August 2020, and was only 6 per cent below February 2020 levels in December 2021.

On the other hand, formal white collar workers in urban areas are less contact-intensive and are secure in the short term in terms of job contract. They are also more likely to belong to the top quintile of the urban distribution (Table 5). These occupation groups experienced smaller declines in April 2020 and slower recovery in the next period compared to the other occupations. Incomes of white collar workers dropped by 26 per cent in April 2020 and recovered to below 19 per cent in August 2020 after the lockdown. Even in December 2021 they were 17 per cent below February 2020 levels (Table 6).

6 Heterogeneity

We now present results of the impact of the pandemic by social groupings and geographical location of the household. We estimate Equation 1 separately for each of the categories in these groupings.

6.1 Caste

The pandemic caused the sharpest drop in seasonally adjusted monthly per capita incomes of Scheduled Caste (SC) households (Figure 8). They suffered a drop of 55 per cent in April 2020 compared to February 2020. The income fall was between 40 and 50 per cent for Other Backward Classes (OBC) and Scheduled Tribes (ST) households. ST households experienced the most rapid recovery and were close to pre-pandemic levels by the end of 2020. SC and OBC households also experienced substantive recovery from the decline during the lockdown. General Category (GC) households experienced the least fall in incomes during the lockdown. Their incomes fell by less than 30 per cent, but they also saw a slow recovery, and their incomes continued to remain 10 per cent below pre-pandemic levels in December 2021. This pattern across caste categories might be because of occupational segregation by caste groups. SC and ST are more likely to be in low-end, contact-intensive occupations that recovered after the lockdown, whereas GC households are more likely to be in the formal sector or high-end occupations that recovered slowly. This pattern exists in both rural and urban areas (Figures A4 and A5).

6.2 Religious groups

The pandemic led to the highest drop in incomes of Muslim households with a more than 50 per cent drop in their incomes in April 2020 compared to February 2020. The drop was around 40 per cent for Hindus.[24] Incomes recovered to about 5 per cent below pre-pandemic levels for Hindus and 10 per cent below pre-pandemic levels for Muslims by December 2021 (Figure 9). This pattern exists in both rural and urban areas (Figures A6 and A7).

[24] We categorized households under three religious groups—Hindus, Muslims, and Others. The Others category constitutes only 4 per cent of the population. We show the graphs only for the two major religion groups, Hindus and Muslims.

6.3 HDI levels

On categorization of states by the HDI, we find the drop in incomes in April 2020 to be similar for all categories—around 40 per cent. The recovery was the quickest for the low HDI states. These states made a full recovery before the coming of the second wave. Recovery was not complete for either the medium HDI states or the high HDI states, the pace of recovery being the slowest for the high HDI states (Figure 10). By December 2021, the averge income in the high HDI states was around 20 per cent lower than pre-pandemic levels. A similar pattern exists in both rural and urban areas (Figures A8 and A9).

6.4 Migrant population

The two groupings of states by the magnitude of migrant population suffered a similar drop in incomes in April 2020—around 40 per cent lower than February levels. However, the recovery was differential. The low-migration states saw a quicker recovery and made a full recovery back to pre-pandemic levels before the second wave again caused a drop in incomes. In contrast, the high-migration states saw a slower recovery, remaining 10 per cent below the pre-pandemic level in December 2021 (Figure 11). A similar pattern exists in both rural and urban areas (Figures A10 and A11).

6.5 Seasonality adjustments

Seasonality adjustment might introduce distortions and impact our conclusions, so we repeat our main analysis with non-seasonality-adjusted data. We find that qualitatively the results hold—urban areas are more impacted than rural, and both have a rapid recovery after the lockdown but still remain below pre-pandemic levels in most of the post-lockdown phase. The distributional analysis with deciles also portrays a similar pattern as with seasonally adjusted data. Lower deciles experience sharper falls and quicker recovery, while top deciles have a smaller fall in lockdown but muted recovery (figures available on request).

7 Shortcomings of CPHS data

CPHS provides high-frequency, nationally representative longitudinal survey data on a range of topics. But its sampling methodology, survey instrument, and the claim of national representativeness have been questioned (Dreze and Somanchi 2021a; Somanchi 2021; Pais and Rawal 2021). Several differences in the sampling methodology lead to the sample being significantly different from the other official nationally representative surveys. This might impact any analysis using the data (including ours), and there have been some recent efforts towards reweighting the CPHS data (Sinha Roy and Van Der Weide 2022). In this section, we discuss some of these concerns and the implications they might have on the results presented so far.

There are several differences in the sampling methodology between CPHS and the nationally representative surveys conducted by the National Sample Survey (NSS) (Sinha Roy and Van Der Weide 2022; Dreze and Somanchi 2021b). One consequential difference is that while selecting households within a village, CPHS does not list all households but instead selects every Nth household in each village starting from the main street in the village. This might lead to under-representation of the poorer and marginalized households that are likely to reside in the outskirts (Dreze and Somanchi 2021a). Somanchi (2021) shows that women, young children, and the illiterate are under-represented in the CPHS sample compared to NSS samples. Somanchi (2021) also finds that the composition of CPHS itself was changing over time. Between 2016 and 2020, the bias against the poor and uneducated grew significantly. CMIE maintains that CPHS is nationally representative even with these differences (Vyas 2021).

The comparison of CPHS data with other official nationally representative data also indicates substantive differences in employment and income statistics. Abraham and Shrivastava (2019) find that CPHS substantially underestimates the women's labour force participation rate. They estimate that while the difference in the men's labour force participation rate between CPHS and PLFS is only 5 per cent, women's labour force participation is underestimated by 40 per cent in CPHS compared to PLFS. Jha and Basole (2022) find that individual income levels are higher in CPHS than in PLFS for 2018–19. At the all-India level, the CPHS average is 29 per cent higher than that in PLFS. The difference is higher in the rural sector at 46 per cent and at 13 per cent for the urban sector (Figure A12).

Sinha Roy and Van Der Weide (2022) attempt to address the differences in instrument design as well as those in sampling design by undertaking a reweighting exercise on the CPHS data. The exercise relies on other nationally representative survey data in the same year to reweight the CPHS data. Since no nationally representative data are available for any years beyond 2019, adjusted weights are not available for 2020 or 2021. So we cannot use the re-weighting to check the robustness of our results.

As has also been mentioned in the introduction, there was a sharp drop in the households that CMIE managed to interview during the lockdown months, reflected in the significantly lower response rates. Further, as the survey moved from an in-person format to a telephonic mode, it is highly likely that this shift entailed missing the poorest of the households on account of lack of phones and lack of money for recharging mobile phones, for example. Several purposive surveys during the lockdown have documented the large impacts on the informal economy and the poor compared to the better off (Azim Premji University 2020; Basole et al. 2021). If CPHS under-represents the informal economy, then our estimates of regressive impacts during the lockdown would be an underestimate. Wealthy households typically are not captured in *any* household survey. These two combined together—absence of the poorest and the richest segments of the economy—suggests that our results are likely to be conservative estimates of the extent of poverty and inequality changes.

8 Conclusion

While the COVID-19 pandemic is foremost a health crisis, the economic impact of the pandemic on livelihoods, incomes, inequality, and poverty cannot be overemphasized. This study uses high-frequency data from household surveys to estimate the impact of the pandemic on income levels, income inequality, and poverty. Households experienced a significant drop in incomes during the lockdown, which has not fully recovered even 22 months after the start of the pandemic. The entire income distribution has shifted to the left, leading to an increase in poverty levels in the post-lockdown phase. Inequality increased during the lockdown but has returned to pre-pandemic levels in the post-lockdown phase.

Income of the lower deciles saw a sharp decline in the lockdown but were quick to recover. On the other hand, the upper deciles experienced smaller initial shock from the lockdown, but recovery has been slow and incomplete. This pattern is due to the different occupation mix amongst the lower and upper quintiles. Contact-intensive and less secure occupations (populated by the lower quintiles) saw larger drops and quicker recovery. More formal and secure occupations (dominated by the upper quintiles) saw comparatively smaller losses initially but have been slow to recover. The sharpest declines in incomes during the pandemic have been associated with the nationwide lockdown rather than the two COVID infection waves. The economic impact during the peak of the COVID waves has been relatively milder in terms of the income declines.

It also must be stated that even with its potential limitations, CPHS has allowed researchers to answer pertinent and critical questions during these times of crisis. Due to the lack of alternate data over this

period, we attempt to use all available knowledge about the CPHS to put caveats to our results, allowing one to make informed policy decisions on the basis of these findings.

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Table 1: Percentage of individuals below various poverty lines in various cumulative periods

	Pre-COVID	Lockdown	Post-lockdown	Second wave	Post-second wave
National minimum wage					
Rural (INR2,900 PC per month)	32.27	62.32	41.04	45.99	35.80
Urban (INR3,344 PC per month)	17.83	55.88	27.93	34.60	24.11
Seventh pay commission minimum wage					
Rural (INR7,000 PC per month)	85.87	90.91	90.48	89.08	87.29
Urban (INR7,000 PC per month)	63.73	81.83	73.14	74.79	70.82
World Bank international poverty line $2 PPP					
Rural (INR1,281 PC per month)	1.13	28.69	3.94	8.75	4.70
Urban (INR1,281 PC per month)	0.08	21.16	0.73	2.35	0.45

Note: the table presents the percentage of individuals who live in households that earn less than different income thresholds on a per capita basis in rural and urban areas. The thresholds are all defined in constant January 2020 terms. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post-second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table 2: Income inequality measures by pandemic periods

Period	**Mean**	**Median**	**Gini**	**GE(0)**	**GE(2)**	**P90P10**
Rural						
Pre-COVID	4,655	3,390	0.44	0.39	0.88	6.82
Lockdown	3,751	2,534	0.51	0.51	0.94	20.80
Post-lockdown	3,928	2,985	0.45	0.39	0.63	14.98
Second wave	4,400	2,890	0.49	0.47	0.85	8.89
Post-second wave	4,455	3,394	0.44	0.37	0.61	10.50
Urban						
Pre-COVID	7,724	5,482	0.41	0.30	0.46	6.24
Lockdown	5,572	3,913	0.46	0.38	0.53	9.76
Post-lockdown	5,884	4,321	0.41	0.29	0.41	6.11
Second wave	5,960	4,344	0.39	0.27	0.37	5.74
Post-second wave	6,168	4,648	0.37	0.24	0.32	5.04

Note: the table presents various distribution and inequality statistics for different time periods. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post-second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table 3: Distribution of occupation categories within each income quintile in rural sector

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	% in total population
Wage labour	29.75	22.61	17.79	13.92	7.41	18.65
Agricultural labour	8.94	10.44	10.71	10.52	6.7	9.14
Entrepreneur	14.2	17.19	17.2	17.43	15.33	16.3
Small farmer	30.23	27.2	26.05	22.03	17.65	23.62
Retired	4.19	4.38	4.95	5.3	7.1	5.21
Formal	6.56	9.95	11.48	14.25	21.58	13.46
Big farmer	6.12	8.23	11.82	16.54	24.22	13.61
Total	100	100	100	100	100	100

Note: the table gives the average share of different household occupation groups in each income quintile in the rural areas between March 2019 and February 2020. Table A2 in the Appendix gives a detailed discussion on the creation of the occupation groups. Income quintiles are based on a one-year average household income to smooth the month-to-month fluctuations in incomes.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table 4: Change in rural average monthly household per capita income by occupation groups

	Agricultural labour	Wage labour	Retired	Small farmer	Big farmer	Entrepreneur	Formal sector worker
Jan-20	0.05***	0.03***	-0.01	0.02	0.07*	0.05***	0.02*
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-20	-0.19***	-0.26***	-0.06*	-0.17***	-0.02	-0.17***	-0.14***
Apr-20	-0.67***	-0.85***	-0.28***	-0.12***	-0.02	-0.58***	-0.40***
May-20	-0.45***	-0.65***	-0.19***	-0.12***	-0.01	-0.43***	-0.32***
Jun-20	-0.16***	-0.19***	-0.14***	-0.16***	-0.24***	-0.15***	-0.19***
Jul-20	-0.13***	-0.11***	-0.13***	-0.15***	-0.38***	-0.09***	-0.14***
Aug-20	-0.06***	-0.04***	-0.10***	-0.13***	-0.33***	-0.04***	-0.08***
Sep-20	-0.15***	-0.13***	-0.15***	-0.26***	-0.12***	-0.11***	-0.16***
Oct-20	-0.23***	-0.25***	-0.27***	-0.13***	0.15***	-0.22***	-0.26***
Nov-20	-0.19***	-0.22***	-0.23***	-0.09***	0.02	-0.19***	-0.22***
Dec-20	-0.11***	-0.13***	-0.14***	-0.01	-0.22***	-0.13***	-0.16***
Jan-21	0.02*	-0.04***	-0.07**	0.02	-0.14***	-0.05***	-0.07***
Feb-21	-0.08***	-0.06***	-0.14***	-0.14***	-0.34***	-0.09***	-0.09***
Mar-21	-0.13***	-0.12***	-0.15***	-0.03*	0.07**	-0.12***	-0.14***
Apr-21	-0.22***	-0.24***	-0.22***	0.02	0.35***	-0.20***	-0.20***
May-21	-0.22***	-0.28***	-0.23***	-0.06***	-0.17***	-0.26***	-0.21***
Jun-21	0.02	-0.11***	-0.14***	0.02	-0.28***	-0.09***	-0.11***
Jul-21	0.02	-0.03***	-0.08**	-0.02	-0.20***	-0.04***	-0.05***
Aug-21	0.09***	0.01	-0.10***	0.05***	-0.23***	0.02	0.03
Sep-21	0.01	-0.04***	-0.16***	-0.02	-0.29***	-0.05***	-0.08***
Oct-21	-0.11***	-0.17***	-0.26***	-0.09***	-0.10***	-0.14***	-0.19***
Nov-21	-0.06***	-0.14***	-0.18***	-0.04**	0.01	-0.11***	-0.15***
Dec-21	0.02*	-0.07***	-0.11***	0.20***	-0.07**	-0.04***	-0.08***
Observations	193,805	357,151	114,888	477,742	332,763	320,665	307,506

Note: the table gives the proportionate change in per capita seasonally adjusted income estimated separately for the rural households belonging to different occupation categories using Equation 1. Table A2 gives a detailed discussion on the creation of the occupation groups. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. Standard errors are clustered at the household level. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table 5: Distribution of occupation categories within each income quintile for urban sector

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	% in total population
Agricultural labour	5.01	4.37	3.74	2.83	1.53	3.49
Entrepreneur	32.48	36.28	35.73	31.47	23.99	32.04
Wage labour	27.58	19.78	16.3	10.98	3.98	15.41
Non-technical worker	16.54	14.76	12.69	10.41	5.38	11.87
Industrial worker	8.23	9.31	9.91	9.64	8.16	9.17
Retired	6.07	7.92	8.98	11.49	16.21	10.21
Formal white-collar	4.09	7.58	12.64	23.19	40.75	17.81
Total	100	100	100	100	100	100

Note: the table gives the average share of different household occupation groups in each income quintile in the rural areas between March 2019 and February 2020. Table A2 gives a detailed discussion on the creation of the occupation groups. Income quintiles are based on a one-year average household income to smooth the month-to-month fluctuations in incomes.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

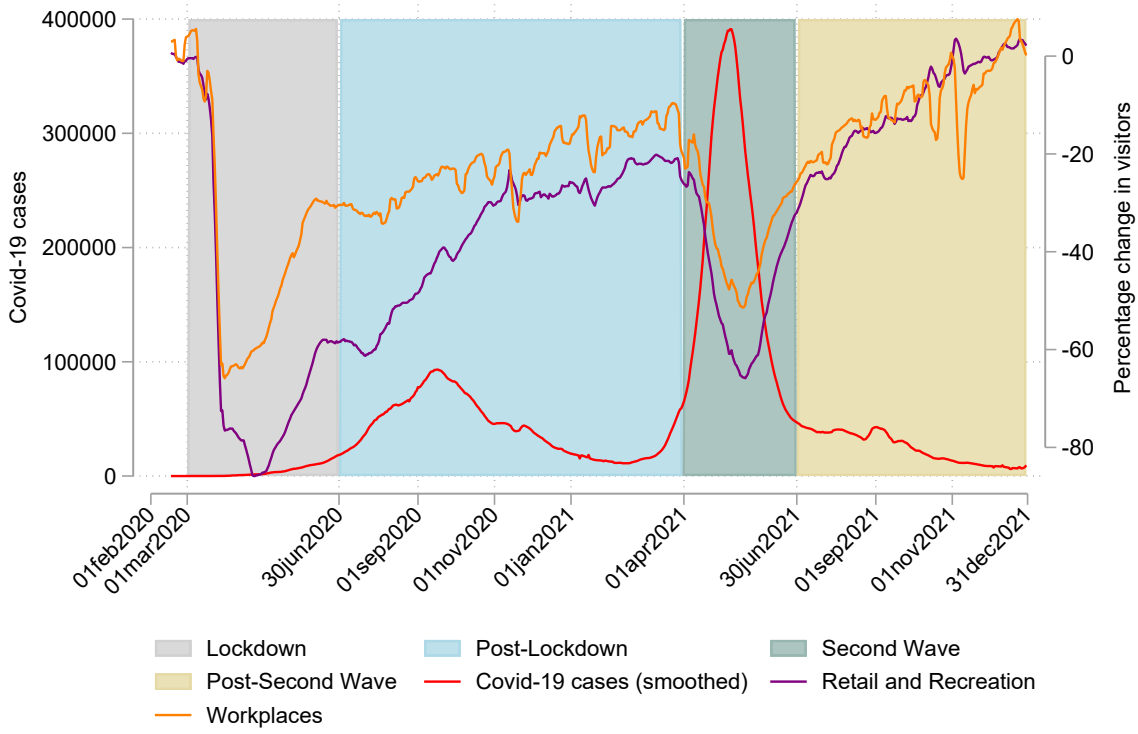
Table 6: Change in urban monthly household per capita income by occupation groups

	Agricultural labour	Formal white-collar	Industrial worker	Retired	Wage labour	Entrepreneurs	Non-technical worker
Jan-20	0.04	0.01**	0.07***	0.06***	0.03***	0.03***	0.04***
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-20	0.23***	-0.06***	-0.06***	-0.08***	-0.18***	-0.17***	-0.09***
Apr-20	-0.23***	-0.26***	-0.44***	-0.22***	-0.75***	-0.65***	-0.45***
May-20	-0.23***	-0.25***	-0.36***	-0.23***	-0.52***	-0.48***	-0.37***
Jun-20	-0.01	-0.20***	-0.19***	-0.18***	-0.24***	-0.24***	-0.19***
Jul-20	-0.34***	-0.19***	-0.17***	-0.17***	-0.20***	-0.18***	-0.14***
Aug-20	-0.18***	-0.19***	-0.16***	-0.15***	-0.17***	-0.16***	-0.11***
Sep-20	-0.14***	-0.20***	-0.17***	-0.17***	-0.18***	-0.16***	-0.11***
Oct-20	0.23***	-0.20***	-0.15***	-0.19***	-0.18***	-0.16***	-0.12***
Nov-20	0.07	-0.20***	-0.09***	-0.19***	-0.15***	-0.14***	-0.10***
Dec-20	-0.12***	-0.18***	-0.12***	-0.19***	-0.14***	-0.14***	-0.08***
Jan-21	0.15***	-0.14***	-0.08***	-0.13***	-0.07***	-0.09***	-0.02*
Feb-21	-0.16***	-0.15***	-0.09***	-0.18***	-0.13***	-0.12***	-0.03***
Mar-21	0.12**	-0.16***	-0.08***	-0.21***	-0.14***	-0.13***	-0.05***
Apr-21	0.26***	-0.19***	-0.11***	-0.24***	-0.18***	-0.19***	-0.08***
May-21	-0.03	-0.22***	-0.19***	-0.24***	-0.30***	-0.32***	-0.17***
Jun-21	-0.04	-0.19***	-0.10***	-0.21***	-0.14***	-0.16***	-0.06***
Jul-21	-0.23***	-0.18***	-0.11***	-0.23***	-0.12***	-0.13***	-0.04***
Aug-21	-0.08*	-0.17***	-0.10***	-0.21***	-0.10***	-0.09***	-0.03***
Sep-21	-0.11***	-0.18***	-0.10***	-0.21***	-0.10***	-0.10***	-0.03***
Oct-21	0.27***	-0.18***	-0.10***	-0.22***	-0.09***	-0.11***	-0.04*
Nov-21	0.10**	-0.19***	-0.10***	-0.20***	-0.08***	-0.10***	-0.04***
Dec-21	-0.03	-0.17***	-0.08***	-0.18***	-0.06***	-0.09***	-0.03**
Observations	128,460	720,894	309,944	421,904	678,127	1,420,348	463,025

Note: the table gives the proportionate change in per capita seasonally adjusted income estimated separately for the urban households belonging to different occupation categories using Equation 1. Table A2 gives a detailed discussion on the creation of the occupation groups. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. Standard errors are clustered at the household level. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

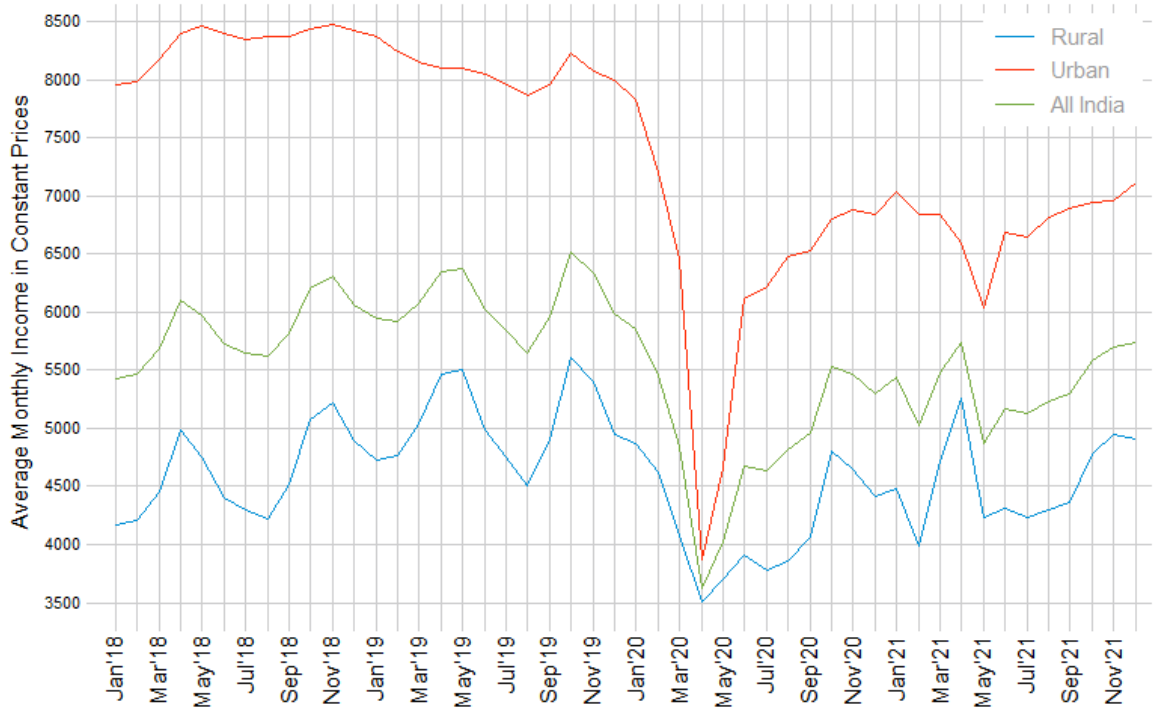
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 1: Pandemic phases, infection, and mobility rates



Source: authors' illustration based on data by Ritchie et al. (2020).

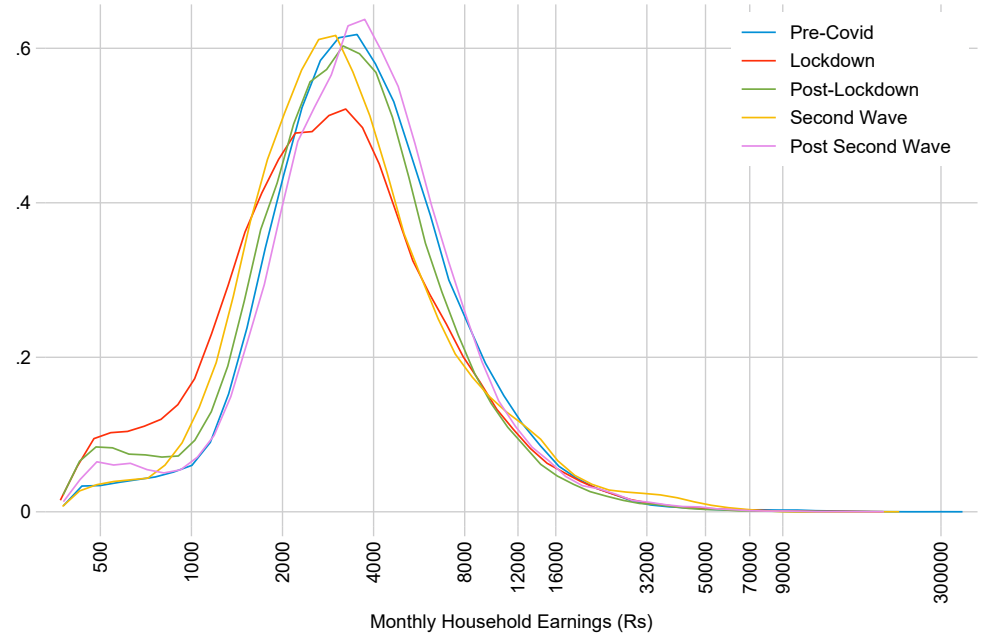
Figure 2: Average monthly household per capita income (without seasonality adjustment)



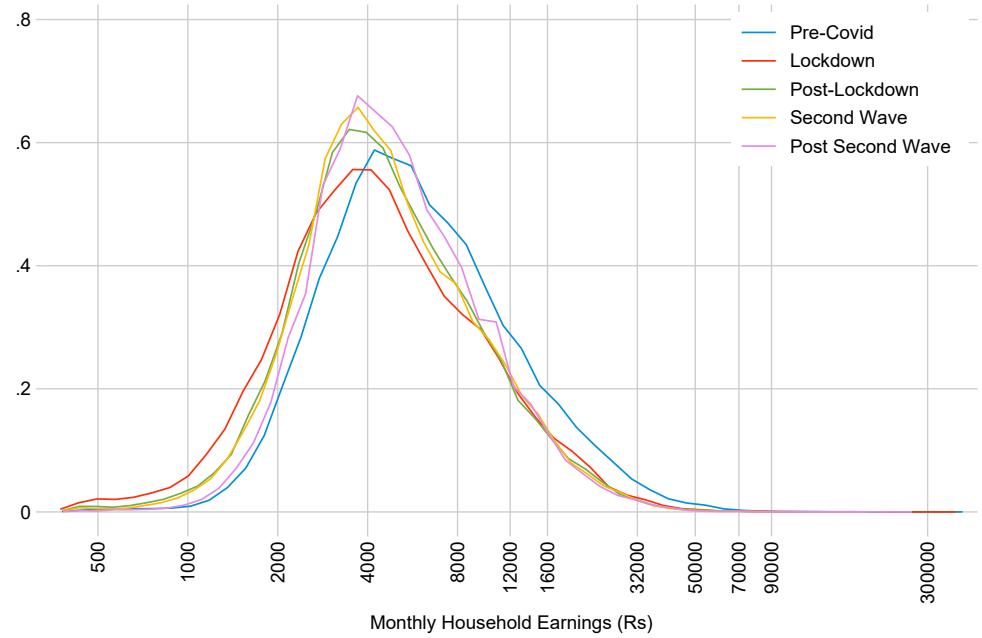
Note: the figure plots the average real monthly per capita household income for all-India and rural and urban sectors between January 2018 and December 2021. The income levels are not seasonally adjusted.
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 3: Distribution of income for various time periods

(a) Rural



(b) Urban

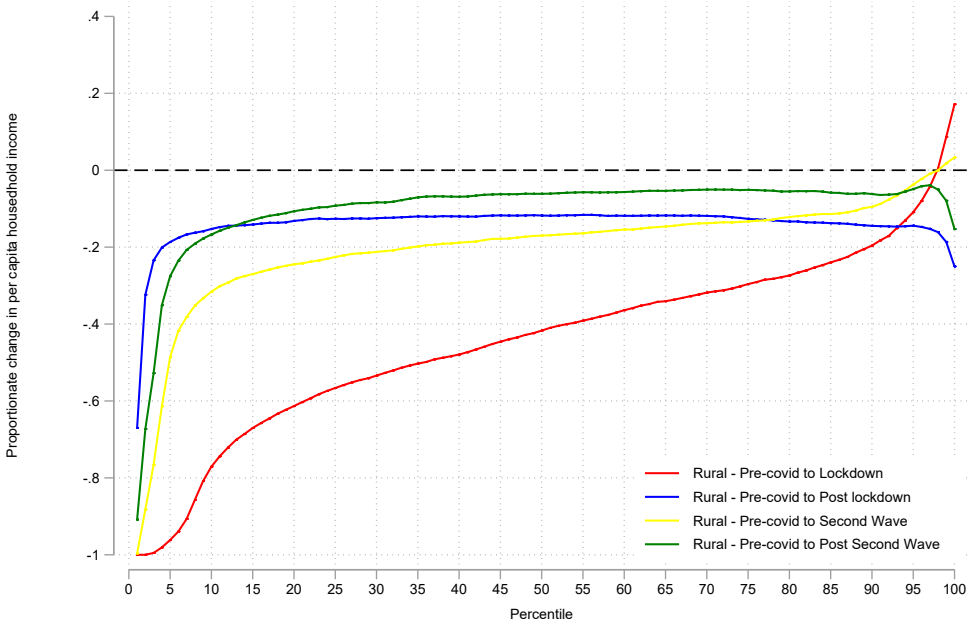


Note: the above figures are kernel density plots of average per capita household income for each percentile for the different periods. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post-second wave refers to the period from July 2021 to December 2021.

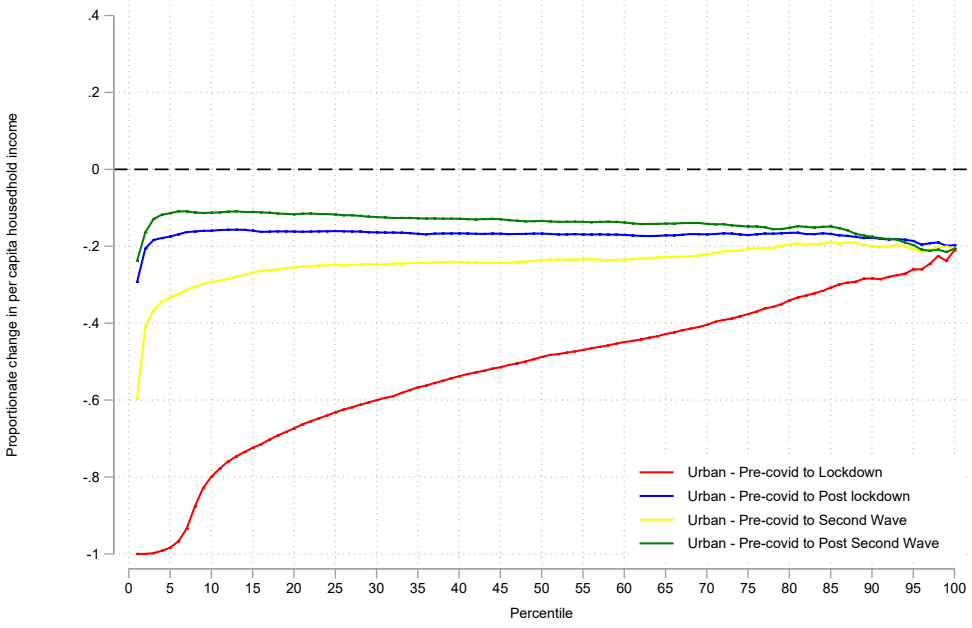
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 4: Growth incidence curves

(a) Rural



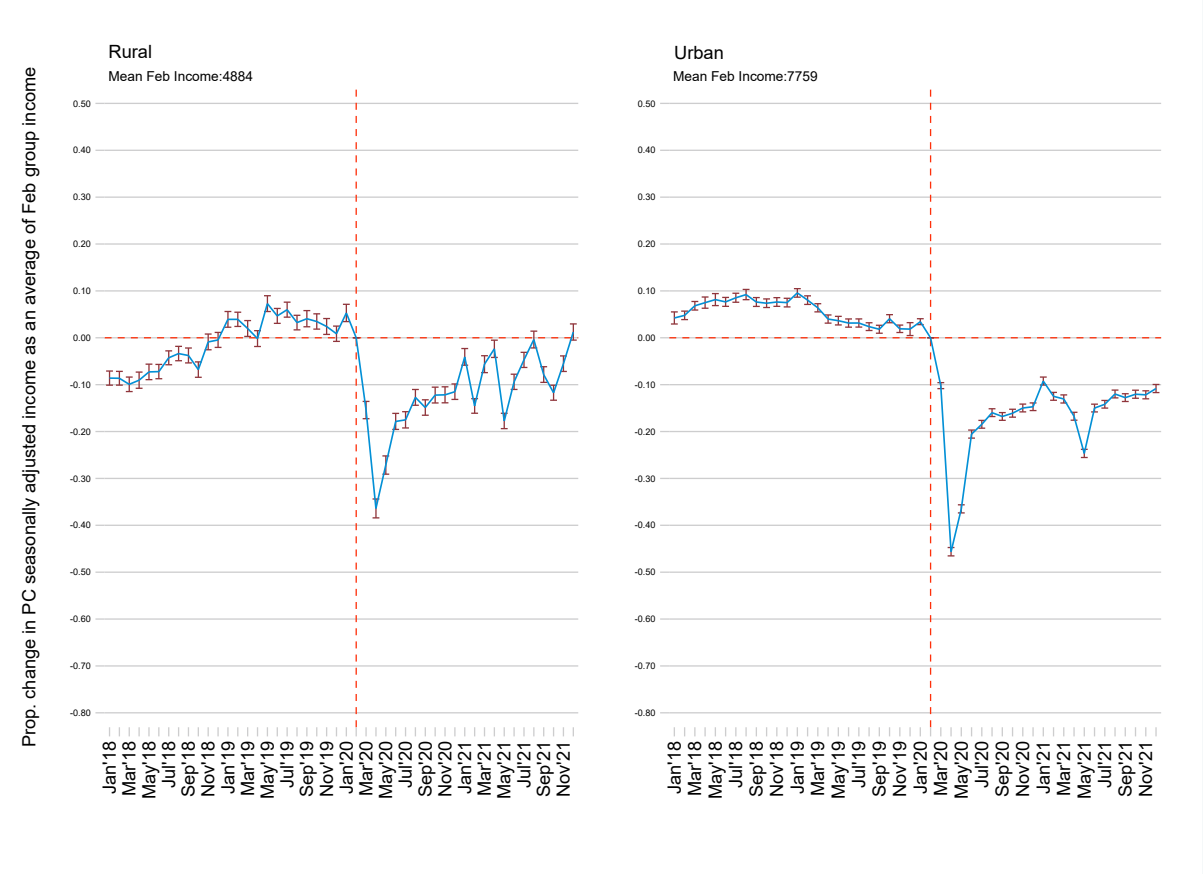
(b) Urban



Note: this figure plots the proportionate change in average per capita household income for each percentile between the different periods. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post-second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 5: Change in average monthly household per capita income by region

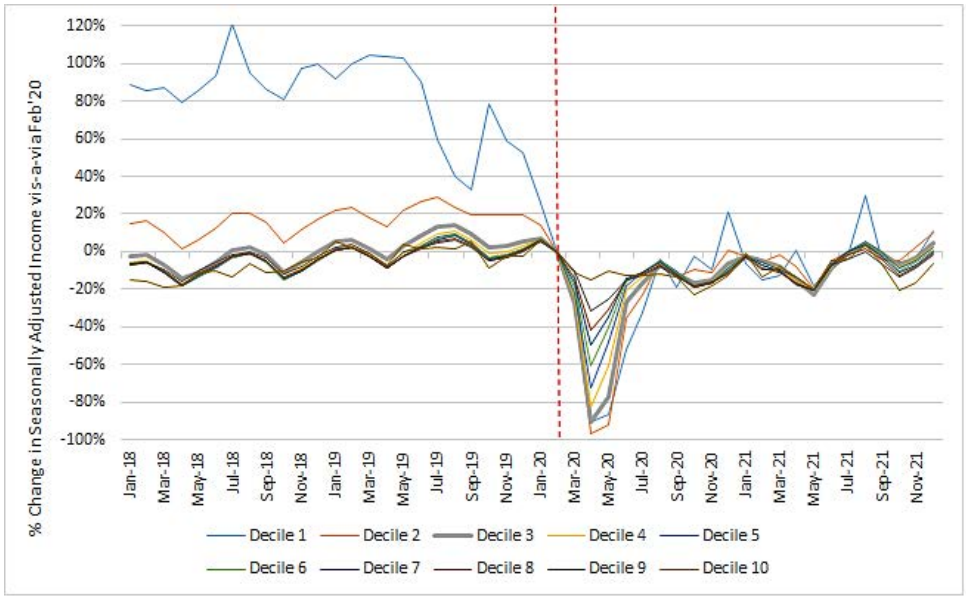


Note: the graph plots the proportionate change in per capita seasonally adjusted income estimated separately for rural and urban areas using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

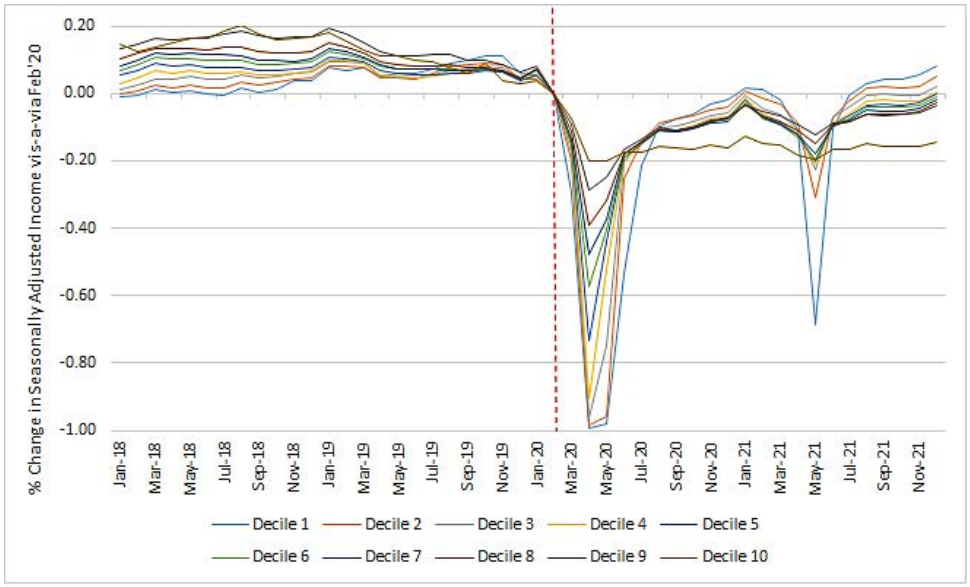
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 6: Change in average seasonally adjusted monthly household per capita income vis-a-vis February 2020 by income deciles

(a) Rural



(b) Urban

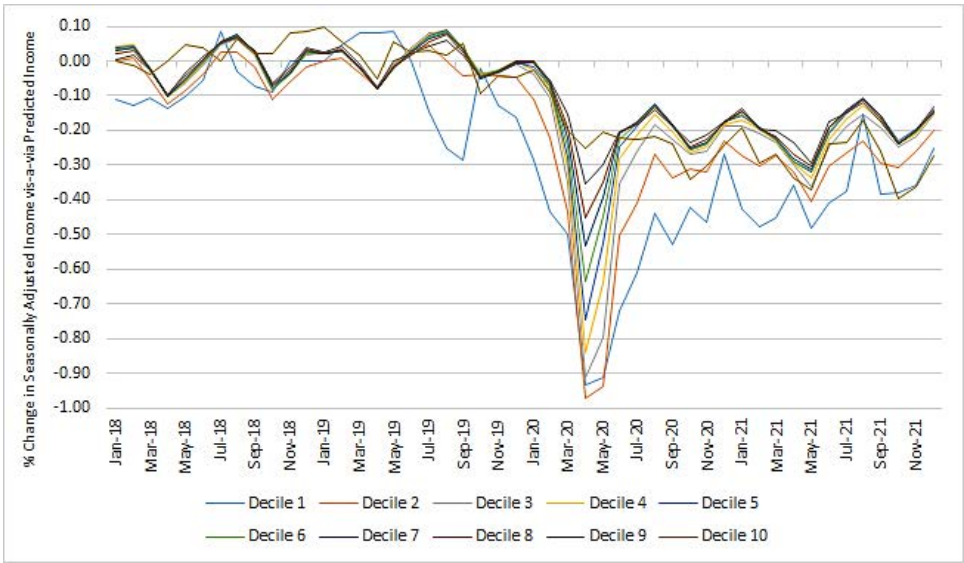


Note: the graph plots the percentage change in per capita seasonally adjusted income estimated separately for rural and urban areas using Equation 1 for each income decile. Households are classified into income deciles in each month separately based on their per capita incomes in that month. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. Refer to Tables **??** and A10 in the Appendix for the absolute monthly income levels and the corresponding confidence levels.

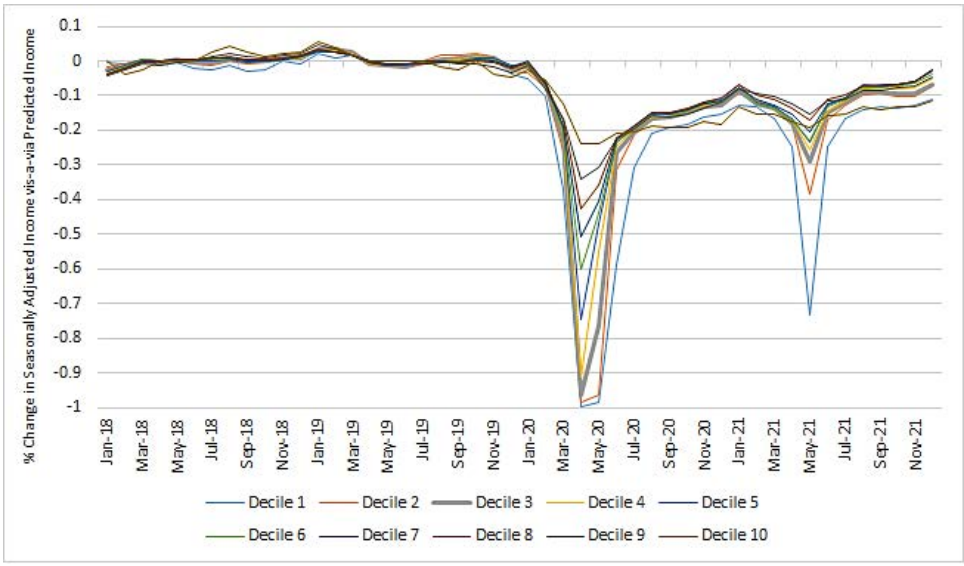
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 7: Change in average seasonally adjusted monthly household per capita income vis-a-vis predicted incomes by income deciles

(a) Rural



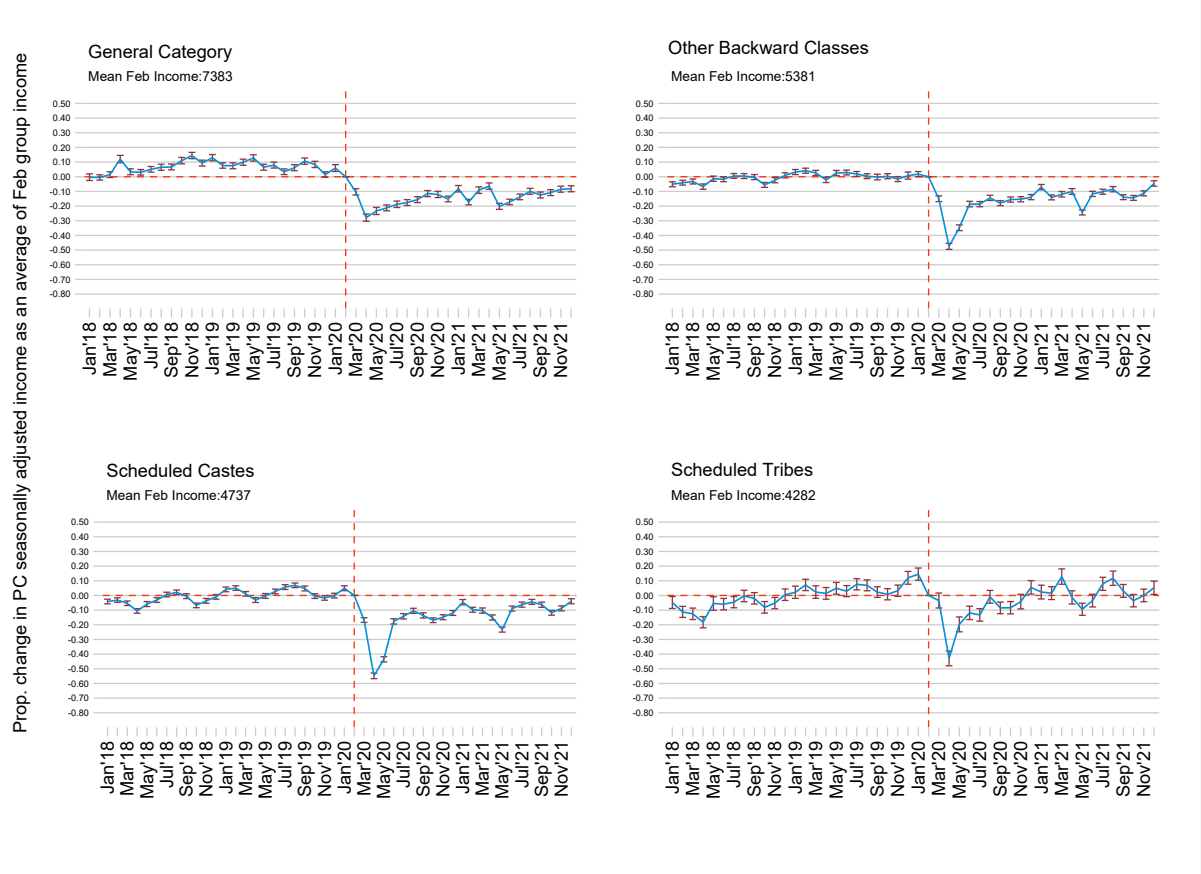
(b) Urban



Note: the graph plots the percentage change in per capita seasonally adjusted income estimated separately for rural and urban areas using Equation 2 for each income decile. Households are classified into income deciles in each month separately based on their per capita incomes in that month. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. Refer to Tables A11 and A12 in the Appendix for the absolute monthly income levels and the corresponding confidence levels.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

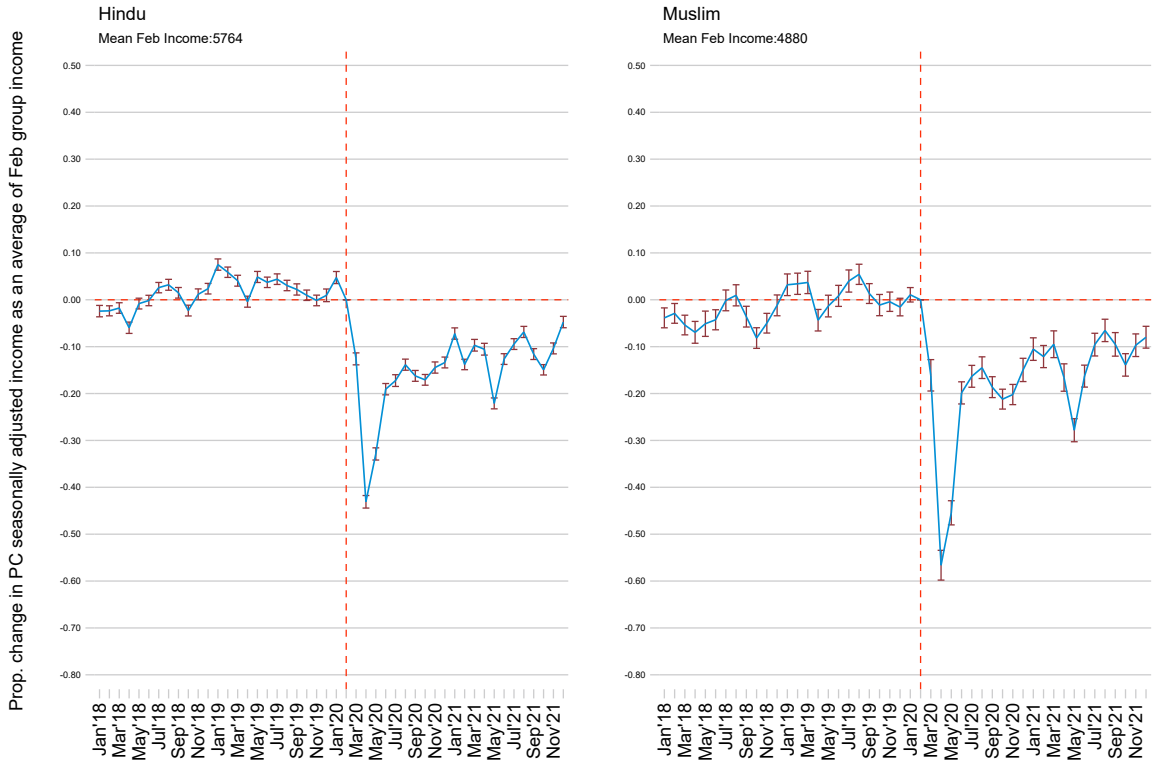
Figure 8: Change in average monthly household per capita income by caste



Note: the graphs plot the proportionate change in per capita seasonally adjusted income estimated separately for the four caste categories using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 9: Change in average monthly household per capita income by religion



Note: the graphs plot the proportionate change in per capita seasonally adjusted income estimated separately for Hindus and Muslims using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 10: Change in average monthly household per capita income by states grouped by HDI

Note: the graphs plot the proportionate change in per capita seasonally adjusted income estimated separately for states with low, medium, and high HDI using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure 11: Change in average monthly household per capita income by per cent of migrants in states

Note: the graphs plot the proportionate change in per capita seasonally adjusted income estimated separately for states with a low and high proportion of migrant population using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Appendix

[Note: the appendix was left unchecked.]

Table A1: Distribution of caste, religion, sector, and family size by waves

		w1'19	w2'19	w3'19	w1'20	w2'20	w3'20	w1'21	w2'21	w3'21
Caste (%)	Intermediate caste	9.6	9.53	9.35	9.63	9.39	9.79	9.46	9.85	9.54
	Other backward classes	40.95	41.13	41.12	41.6	40.71	41.26	40.89	40.63	41.31
	Scheduled caste	22.86	22.97	22.89	22.62	23.93	23.44	22.79	23.07	23.3
	Scheduled tribe	6.79	6.5	6.91	6.44	6.37	6.1	6.81	6.67	6.53
	Upper caste	19.8	19.87	19.73	19.71	19.61	19.41	20.05	19.78	19.32
	Total	100	100	100	100	100	100	100	100	100
Religion (%)	Buddhist	0.39	0.41	0.41	0.42	0.46	0.41	0.45	0.51	0.49
	Christian	1.51	1.53	1.6	1.63	1.58	1.65	1.66	1.59	1.62
	Hindu	86.36	86.33	86.76	87.07	87.77	86.86	86.61	86.83	87.22
	Jain	0.17	0.18	0.17	0.17	0.14	0.18	0.19	0.2	0.19
	Khasi	0.03	0.03	0.03	0.04	0.02	0.02	0.04	0.02	0.04
	Muslim	9.57	9.54	9.02	8.74	8.12	8.87	9.05	8.72	8.48
	Other religion	0.01	0.01	0.01	0.01	0	0.01	0	0.01	0.02
	Sikh	1.96	1.95	1.99	1.92	1.91	2	1.99	2.11	1.95
	Total	100	100	100	100	100	100	100	100	100
Region (%)	Rural	67.87	57.48	67.36	51.67	60.18	66.05	67.68	68.56	67.97
	Urban	32.13	42.52	32.64	48.33	39.82	33.95	32.32	31.44	32.03
	Total	100	100	100	100	100	100	100	100	100
Household size	Mean size	4	4.1	3.9	3.8	3.8	3.8	3.8	3.8	3.7

Note: the table presents the distribution of households by caste category, religion, and region of residence (rural/urban) over waves between 2019 and 2021. It also reports the average household size over waves. w1'19 is the first wave of 2019 (January 2019–April 2019), w2'19 is the second wave of 2019 (May 2019–August 2019), and w3 2019 is the third wave of 2019 (September 2019–December 2019). Similarly for the years 2020 and 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A2: Classification of occupation categories

Rural	
Aggregated occupation groups	**CPHS household occupation group**
Agricultural labourers	Agricultural labourers
Wage labourers	Wage labourers
Enterpreneurs	Entrepreneurs Home-based workers Self-employed entrepreneurs Small traders/hawkers Miscellaneous
Retired/Aged	Retired/aged
Small/marginal farmers	Small/marginal farmers
Organized farmers	Organized farmers
Formal	Support staff White-collar clerical employees White-collar professional employees Business and salaried employees Industrial workers Legislators/social workers/activists Managers/supervisors Non-industrial technical employees Qualified self-employed professionals

Urban	
Aggregated occupation groups	**CPHS Household occupation group**
Agriculture	Agricultural labourers Organized farmers Small/marginal farmers
Wage labourers	Wage labourers Miscellaneous
Entrepreneurs	Entrepreneurs Self-employed entrepreneurs Small traders/hawkers
Industrial workers	Home-based workers Industrial workers
Support/non-technical employees	Non-industrial technical employees Support staff
Retired/aged	Retired/aged
Formal white collar	White-collar clerical employees White-collar professional employees Qualified self-employed professionals Legislators/social workers/activists Managers/supervisors Business and salaried employees

Note: we use the household occupation groups in CMIE-CPHS to re-categorize occupations according to the nature and/or extent of their formality (formal, less formal, informal) and their contact-intensiveness (less face-to-face contact versus more face-to-face contact). Since the categories are broad, the matching is not perfect, but we try to keep them meaningful. The classification is done separately for the rural and urban sectors.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A3: Percentage of individuals below various poverty lines in select months

	Jan 2019	Apr 2019	Nov 2019	Jan 2020	Apr 2020	Nov 2020	Jan 2021	Apr 2021	Nov 2021
National minimum wage									
Rural (INR2,900 PC per month)	42.27	46.79	42.86	40.00	73.49	52.52	44.13	52.96	44.85
Urban (INR3,344 PC per month)	22.31	24.08	21.92	24.18	66.71	30.26	26.78	32.90	25.96
Seventh pay commission minimum wage									
Rural (INR7,000 PC per month)	84.62	86.68	85.21	83.37	91.31	88.53	86.20	87.35	86.95
Urban (INR7,000 PC per month)	62.90	64.38	65.36	65.77	84.92	73.00	70.55	73.89	70.62
World Bank international poverty line $2 PPP									
Rural (INR1,281 PC per month)	12.26	11.89	11.41	14.11	53.95	16.55	16.00	16.59	14.47
Urban (INR1,281 PC per month)	1.39	1.43	1.45	1.84	48.20	1.73	1.63	2.50	1.47

Note: the table presents the percentage of individuals who live in households that earn less than different income thresholds on a per capita basis in rural and urban areas.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A4: Poverty by caste and periods

Period	Intermediate	OBC	SC	ST	General	Total
Pre-COVID						
Rural	16.0	33.9	38.9	37.5	30.6	32.9
Urban	6.1	21.3	24.7	28.4	13.4	18.3
Lockdown						
Rural	44.1	65.6	71.7	61.1	55.8	62.8
Urban	36.7	61.4	66.4	64.3	47.7	56.1
Post-lockdown						
Rural	23.9	42.9	47.8	44.5	41.2	41.7
Urban	12.5	32.3	36.9	33.1	22.6	28.4
Second wave						
Rural	31.2	47.6	54.4	47.9	44.8	46.9
Urban	18.4	38.3	46.7	46.1	27.8	35.1
Post-second wave						
Rural	22.2	38.3	41.3	39.9	34.2	36.8
Urban	11.6	27.3	33.7	33.2	18.6	24.6

Note: the table presents the percentage of individuals who live in households that earn less than the national minimum wage (in January, 2020 terms these amount to INR2,900 per capita in rural areas and INR3,344 per capita in urban areas) belonging to different caste categories. CMIE-CPHS reports a distinct caste category of Intermediate Castes, ranked between General Category and Other Backward Classes. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post-second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A5: Poverty by religion

Period	Hindu	Muslim	Others	Total
Pre-COVID				
Rural	33.0	42.5	8.1	32.2
Urban	17.7	28.1	5.7	18.0
Lockdown				
Rural	62.8	75.2	45.1	62.4
Urban	55.7	71.3	42.6	56.3
Post-lockdown				
Rural	42.3	51.1	15.7	41.2
Urban	28.0	39.3	13.0	28.3
Second wave				
Rural	47.1	59.3	22.5	46.4
Urban	33.9	51.9	20.8	34.9
Post-second wave				
Rural	37.5	40.8	12.4	36.1
Urban	24.2	33.0	10.0	24.2

Note: the table presents the percentage of individuals who live in households that earn less than the national minimum wage (in January 2020 terms, these amount to INR2,900 per capita in rural areas and INR3,344 per capita in urban areas) belonging to different religions. Other religion includes individuals who report themselves as Buddhist, Christian, Jain, Khasi, Sikh, and other religions. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A6: Poverty by state HDI groupings

Period	Low HDI	Medium HDI	High HDI	Total
Pre-COVID				
Rural	39.4	21.2	6.2	28.6
Urban	27.1	12.6	7.0	18.8
Lockdown				
Rural	66.8	53.4	50.2	61.1
Urban	65.1	47.1	49.9	58.0
Post lockdown				
Rural	50.0	27.3	14.6	37.7
Urban	42.2	17.3	20.3	30.5
Second wave				
Rural	53.1	31.7	25.9	42.6
Urban	46.5	20.4	31.1	36.0
Post second wave				
Rural	44.3	22.0	9.9	32.2
Urban	35.6	14.9	15.5	25.5

Note: the table presents the percentage of individuals who live in households that earn less than the national minimum wage (in January 2020 terms, these amount to INR2,900 per capita in rural areas and INR3,344 per capita in urban areas). Refer to footnote 16 for the list of states in each group. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A7: Poverty by migration status of states

Period	Out migration states	In migration states	Total
Pre-COVID			
Rural	41.1	15.6	29.5
Urban	28.2	10.8	19.2
Lockdown			
Rural	67.7	53.4	61.9
Urban	65.3	49.4	58.0
Post lockdown			
Rural	51.4	23.5	38.8
Urban	43.5	19.3	31.0
Second wave			
Rural	54.4	31.0	43.8
Urban	48.4	25.7	36.7
Post second wave			
Rural	45.6	18.2	33.2
Urban	37.0	16.0	26.1

Note: the table presents the percentage of individuals who live in households that earn less than the national minimum wage (in January 2020 terms, these amount to INR2,900 per capita in rural areas and INR3,344 per capita in urban areas). Refer to footnote 15 for the list of states in each group. Pre-COVID refers to the time period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post lockdown refers to the period from June 2020 to May 2021, second wave refers to the period from April 2021 to June 2021, and post second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A8: Income inequality measures for select months

Month	**Mean**	**Median**	**Gini**	**GE(0)**	**GE(2)**	**P90P10**
Rural						
Jan 2019	4,660	3,389	0.44	0.40	0.93	7.18
Apr 2019	4,481	3,093	0.46	0.45	1.04	6.71
Nov 2019	4,640	3,332	0.45	0.42	0.91	6.61
Jan 2020	4,733	3,553	0.44	0.38	0.94	9.27
Apr 2020	3,011	1,281	0.67	0.95	2.49	75.26
Nov 2020	4,077	2,855	0.47	0.44	0.87	8.68
Jan 2021	4,565	3,340	0.45	0.43	0.96	9.41
Apr 2021	4,288	2,842	0.48	0.46	0.85	7.90
Nov 2021	4,358	3,232	0.44	0.38	0.67	7.31
Urban						
Jan 2019	7,753	5,482	0.41	0.31	0.46	6.35
April 2019	7,381	5,290	0.41	0.30	0.50	6.07
Nov 2019	7,264	5,304	0.39	0.27	0.41	5.51
Jan 2020	7,122	5,180	0.39	0.28	0.44	5.64
April 2020	3,852	2,257	0.61	0.67	0.94	180.67
Nov 2020	6,098	4,564	0.38	0.26	0.38	5.30
Jan 2021	6,420	4,858	0.38	0.25	0.38	5.28
Apr 2021	5,956	4,349	0.39	0.26	0.36	5.57
Nov 2021	6,335	4,804	0.36	0.23	0.34	5.07

Note: the table presents various distribution and inequality statistics for different time periods. Pre-COVID refers to the period from January 2019 to February 2020, lockdown refers to the period from March 2020 to May 2020, post-lockdown refers to the period from June 2020 to March 2021, second wave refers to the period from April 2021 to June 2021, and post-second wave refers to the period from July 2021 to December 2021.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A9: Change in rural seasonally adjusted per capita income compared to February 2020

	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Jan-18	185.2***	194.0***	-48.77***	-146.1***	-209.8***	-245.7***	-311.0***	-396.4***	-528.4***	-2,609***
Feb-18	177.9***	211.5***	-27.07***	-129.5***	-182.0***	-218.7***	-261.5***	-344.3***	-422.5***	-2,806***
Mar-18	181.5***	127.7***	-158.1***	-285.6***	-370.8***	-435.5***	-509.8***	-618.9***	-718.1***	-3,243***
Apr-18	165.7***	18.94**	-312.6***	-481.8***	-594.0***	-708.9***	-849.0***	-1,015***	-1,229***	-3,215***
May-18	177.8***	82.32***	-229.2***	-369.7***	-459.5***	-530.8***	-617.0***	-707.2***	-783.5***	-1,926***
Jun-18	194.7***	161.1***	-120.9***	-234.3***	-296.7***	-324.1***	-372.7***	-433.6***	-430.3***	-1,788***
Jul-18	250.7***	261.8***	12.57**	-73.09***	-107.9***	-118.1***	-129.0***	-155.4***	-139.7***	-2,316***
Aug-18	198.3***	267.3***	54.98***	-11.78**	-39.86***	-34.29***	-36.80***	-60.67***	-9.494	-1,122***
Sep-18	179.0***	206.8***	-28.84***	-120.8***	-175.4***	-215.2***	-236.2***	-270.1***	-270.0***	-1,896***
Oct-18	168.7***	61.05***	-238.2***	-385.9***	-489.5***	-584.3***	-669.2***	-805.5***	-941.0***	-1,851***
Nov-18	202.5***	148.2***	-115.8***	-247.2***	-339.9***	-418.5***	-486.6***	-562.2***	-595.6***	-932.6***
Dec-18	208.0***	219.2***	-9.158*	-103.2***	-152.6***	-187.4***	-202.7***	-222.8***	-178.1***	-498.6**
Jan-19	190.6***	287.4***	115.5***	56.71***	43.02***	40.15***	49.32***	54.68***	168.1***	1,021***
Feb-19	207.2***	302.7***	134.4***	85.14***	79.58***	90.84***	104.8***	125.6***	304.8***	463.3*
Mar-19	218.0***	236.7***	26.71***	-44.39***	-80.14***	-91.19***	-114.3***	-146.9***	-92.10***	-112.8
Apr-19	215.3***	174.1***	-79.96***	-189.1***	-268.8***	-327.8***	-409.8***	-513.2***	-602.6***	-1,223***
May-19	214.5***	282.7***	62.55***	-16.05***	-67.52***	-88.25***	-106.1***	-122.2***	-11.35	650.0***
Jun-19	187.3***	348.7***	181.2***	130.2***	108.8***	110.2***	122.7***	87.06***	156.5***	262.7
Jul-19	124.7***	381.1***	286.0***	261.7***	265.9***	281.2***	312.7***	300.1***	344.0***	453.7*
Aug-19	82.79***	308.9***	308.2***	304.5***	324.3***	362.0***	406.6***	434.3***	482.5***	319.4
Sep-19	68.13***	251.7***	197.0***	168.9***	149.4***	181.2***	180.8***	168.6***	162.7***	931.3***
Oct-19	163.7***	255.5***	52.87***	-30.75***	-102.2***	-131.2***	-205.8***	-262.3***	-352.7***	-1,455***
Nov-19	122.2***	252.0***	64.05***	1.422	-49.30***	-54.14***	-110.8***	-149.1***	-231.5***	-458.5**
Dec-19	108.6***	250.6***	123.8***	87.85***	49.92***	60.84***	33.43***	24.91**	-31.11	-468.8**
Jan-20	54.43***	185.9***	152.2***	167.1***	190.7***	269.6***	304.6***	373.7***	426.0***	1,056***
Mar-20	-23.71***	-351.6***	-589.2***	-663.1***	-722.4***	-752.4***	-792.3***	-824.1***	-773.2***	-1,936***
Apr-20	-188.6***	-1,255***	-1,943***	-2,271***	-2,414***	-2,408***	-2,368***	-2,433***	-2,448***	-2,615***
May-20	-180.2***	-1,201***	-1,667***	-1,657***	-1,611***	-1,594***	-1,638***	-1,783***	-1,973***	-1,750***
Jun-20	-108.0***	-458.8***	-581.5***	-569.0***	-597.3***	-629.7***	-690.4***	-872.4***	-1,174***	-2,215***
Jul-20	-66.80***	-297.7***	-350.1***	-358.5***	-372.4***	-427.2***	-509.8***	-697.8***	-1,006***	-2,185***
Aug-20	-8.516*	-60.80***	-153.5***	-163.2***	-159.2***	-188.6***	-245.0***	-411.9***	-644.8***	-2,000***
Sep-20	-39.28***	-175.3***	-251.0***	-310.5***	-354.4***	-443.1***	-549.0***	-741.0***	-1,042***	-2,296***
Oct-20	-5.651	-127.6***	-350.6***	-491.6***	-612.9***	-731.3***	-897.3***	-1,111***	-1,425***	-3,943***
Nov-20	-19.85***	-140.4***	-326.7***	-436.2***	-548.4***	-646.7***	-785.3***	-982.9***	-1,232***	-3,165***
Dec-20	43.36***	13.25	-141.9***	-229.6***	-296.5***	-361.6***	-484.5***	-655.4***	-913.2***	-2,137***
Jan-21	-13.26***	-31.89***	-52.88***	-64.60***	-76.25***	-68.82***	-96.48***	-159.8***	-228.5***	-84.71
Feb-21	-30.36***	-77.00***	-106.0***	-147.3***	-192.9***	-271.4***	-348.0***	-508.6***	-757.5***	-2,361***
Mar-21	-25.72***	-25.40***	-166.9***	-238.7***	-319.1***	-402.6***	-492.8***	-640.9***	-766.8***	-1,412***
Apr-21	1.912	-104.1***	-321.8***	-443.2***	-567.9***	-683.1***	-816.5***	-980.6***	-1,048***	-2,393***
May-21	-38.30***	-252.7***	-488.4***	-573.3***	-679.1***	-798.3***	-969.6***	-1,207***	-1,567***	-3,378***
Jun-21	-14.86***	-66.47***	-184.3***	-213.2***	-238.7***	-266.9***	-308.0***	-434.7***	-540.9***	-825.6***
Jul-21	-4.303	-0.972	-21.20***	-1.570	5.577	5.128	-13.72	-117.6***	-285.0***	-712.6***
Aug-21	61.86***	65.81***	79.09***	127.4***	168.4***	172.0***	178.1***	111.6***	-18.47	721.5**
Sep-21	-8.245*	-50.15***	-17.05***	1.373	-9.133	-36.43***	-104.0***	-249.1***	-518.1***	-1,080***
Oct-21	-10.84**	-61.61***	-160.8***	-227.5***	-290.4***	-394.1***	-535.3***	-724.4***	-1,070***	-3,525***
Nov-21	-8.771*	25.52***	-68.57***	-112.0***	-160.8***	-229.2***	-323.0***	-460.4***	-701.2***	-2,857***
Dec-21	22.56***	133.6***	102.8***	84.82***	71.68***	41.36***	-17.99**	-65.00***	-107.1***	-1,117***
Constant	207.9***	1,303***	2,159***	2,750***	3,331***	3,967***	4,762***	5,885***	7,794***	17,444***
Observations	216,084	198,283	182,654	191,321	195,579	203,413	210,419	220,076	230,947	255,744

Note: the table gives the change in incomes in the rural sector for each month as compared to February 2020 incomes. Standard errors are clustered at the household level. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A10: Change in urban seasonally adjusted per capita income compared to February 2020

	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Jan-18	-16.57	-5.602	47.49***	122.9***	271.0***	392.8***	581.6***	897.2***	1,565***	3,371***
Feb-18	-10.01	25.05***	88.18***	190.1***	350.4***	500.4***	707.1***	1,062***	1,741***	2,877***
Mar-18	20.89*	73.17***	150.7***	281.3***	446.6***	637.7***	853.4***	1,188***	1,945***	3,168***
Apr-18	1.639	46.66***	142.8***	261.2***	409.0***	597.7***	834.4***	1,170***	1,886***	3,448***
May-18	14.01	69.21***	175.2***	283.7***	427.8***	618.5***	849.1***	1,199***	1,957***	3,763***
Jun-18	-3.915	51.33***	157.1***	255.0***	391.4***	589.5***	821.4***	1,167***	1,978***	3,809***
Jul-18	-7.357	46.82***	153.5***	257.1***	387.3***	591.9***	822.9***	1,210***	2,094***	4,254***
Aug-18	26.64**	93.06***	189.8***	267.1***	392.6***	580.0***	793.9***	1,206***	2,180***	4,636***
Sep-18	4.106	71.00***	172.3***	235.7***	344.5***	512.7***	711.7***	1,107***	2,024***	4,040***
Oct-18	17.92	91.96***	185.3***	240.1***	336.6***	512.6***	693.5***	1,071***	1,922***	3,677***
Nov-18	70.59***	122.1***	207.5***	261.4***	360.1***	522.8***	687.9***	1,085***	1,993***	3,757***
Dec-18	69.05***	135.8***	223.6***	285.9***	391.6***	568.6***	744.9***	1,106***	1,991***	3,848***
Jan-19	138.1***	231.0***	332.7***	412.8***	533.2***	725.7***	948.3***	1,328***	2,286***	4,195***
Feb-19	122.6***	230.2***	332.8***	411.2***	514.6***	694.6***	879.3***	1,207***	2,065***	3,606***
Mar-19	142.0***	216.0***	312.2***	374.8***	466.4***	621.0***	779.2***	1,074***	1,803***	3,009***
Apr-19	93.90***	130.3***	182.5***	228.9***	332.3***	491.4***	626.1***	843.8***	1,461***	2,556***
May-19	103.7***	127.8***	168.4***	206.2***	294.9***	433.6***	529.8***	749.6***	1,323***	2,592***
Jun-19	108.0***	122.8***	160.5***	196.0***	273.4***	421.6***	517.5***	737.8***	1,337***	2,236***
Jul-19	133.6***	175.1***	200.0***	218.0***	280.1***	422.2***	511.0***	732.9***	1,371***	2,196***
Aug-19	159.6***	228.3***	245.3***	255.5***	291.2***	428.1***	496.2***	755.4***	1,345***	1,762***
Sep-19	175.8***	244.2***	259.2***	270.9***	303.7***	415.3***	479.7***	673.1***	1,182***	1,395***
Oct-19	204.0***	258.8***	282.6***	303.1***	342.5***	445.9***	518.0***	702.6***	1,156***	2,102***
Nov-19	197.9***	245.6***	270.0***	286.5***	323.2***	407.1***	466.9***	623.4***	984.1***	910.8***
Dec-19	110.8***	123.1***	154.9***	175.9***	193.2***	268.0***	314.5***	419.5***	729.6***	679.5***
Jan-20	100.3***	121.3***	185.5***	225.9***	280.9***	392.8***	515.2***	640.7***	936.6***	866.0***
Mar-20	-537.4***	-570.7***	-617.2***	-673.6***	-735.1***	-858.9***	-977.4***	-1,001***	-1,111***	-1,749***
Apr-20	-1,804***	-2,827***	-3,436***	-3,862***	-3,669***	-3,403***	-3,440***	-3,473***	-3,419***	-4,629***
May-20	-1,776***	-2,760***	-2,656***	-2,226***	-2,200***	-2,389***	-2,679***	-2,851***	-2,963***	-4,639***
Jun-20	-965.3***	-728.8***	-738.3***	-848.8***	-967.1***	-1,112***	-1,300***	-1,590***	-1,966***	-3,975***
Jul-20	-388.8***	-410.5***	-505.2***	-628.3***	-748.3***	-893.7***	-1,049***	-1,277***	-1,629***	-3,994***
Aug-20	-174.0***	-249.8***	-366.7***	-476.6***	-545.8***	-663.4***	-783.0***	-946.3***	-1,208***	-3,633***
Sep-20	-138.1***	-216.3***	-345.3***	-470.1***	-550.6***	-677.8***	-833.2***	-995.1***	-1,301***	-3,769***
Oct-20	-110.5***	-186.6***	-298.5***	-405.4***	-498.8***	-594.6***	-750.9***	-888.0***	-1,190***	-3,845***
Nov-20	-60.89***	-139.9***	-228.6***	-324.6***	-403.9***	-486.7***	-635.8***	-748.6***	-1,010***	-3,503***
Dec-20	-36.60***	-111.7***	-201.2***	-293.3***	-373.9***	-456.0***	-615.0***	-669.5***	-846.3***	-3,768***
Jan-21	27.41**	17.51***	-14.18**	-64.93***	-85.07***	-139.0***	-236.2***	-294.1***	-446.3***	-2,971***
Feb-21	24.66**	-46.66***	-163.7***	-267.1***	-364.4***	-447.3***	-517.5***	-573.7***	-656.2***	-3,471***
Mar-21	-35.44***	-90.63***	-220.7***	-349.1***	-444.3***	-553.4***	-673.5***	-750.0***	-765.6***	-3,557***
Apr-21	-200.2***	-254.4***	-372.7***	-502.1***	-625.9***	-768.2***	-891.3***	-985.4***	-1,073***	-4,182***
May-21	-1,244***	-888.6***	-804.7***	-890.0***	-1,008***	-1,161***	-1,293***	-1,330***	-1,464***	-4,547***
Jun-21	-190.3***	-201.0***	-257.1***	-382.8***	-455.1***	-550.0***	-692.2***	-804.3***	-1,049***	-3,845***
Jul-21	-7.202	-60.77***	-137.8***	-260.1***	-340.9***	-449.0***	-584.9***	-737.7***	-1,014***	-3,847***
Aug-21	56.34***	41.30***	-24.00***	-102.7***	-172.8***	-233.4***	-351.2***	-536.3***	-747.6***	-3,428***
Sep-21	72.78***	62.16***	-11.90**	-81.54***	-166.0***	-245.9***	-379.5***	-570.2***	-800.7***	-3,637***
Oct-21	77.08***	43.07***	-25.83***	-104.2***	-169.4***	-241.8***	-382.9***	-550.4***	-739.8***	-3,597***
Nov-21	103.4***	53.31***	-22.47***	-91.40***	-140.2***	-207.3***	-331.0***	-480.1***	-699.0***	-3,636***
Dec-21	146.8***	150.7***	75.23***	15.51**	-6.592	-49.76***	-130.3***	-226.7***	-435.3***	-3,292***
Constant	1,813***	2,874***	3,569***	4,267***	5,017***	5,941***	7,190***	8,923***	11,844***	23,042***
Observations	446,910	429,112	412,584	409,130	397,848	401,366	402,769	409,431	422,587	412,932

Note: the table gives the change in incomes in the urban sector for each month compared to February 2020 incomes. Standard errors are clustered at the household level. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Table A11: Proportionate change in rural seasonally adjusted per capita income as compared to the predicted income

	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Jan-18	0.324***	0.221***	0.144***	0.125***	0.109***	0.106***	0.0935***	0.0806***	0.0601***	0.0951***
Feb-18	0.310***	0.230***	0.150***	0.128***	0.115***	0.111***	0.103***	0.0883***	0.0737***	0.0749***
Mar-18	0.329***	0.172***	0.0825***	0.0627***	0.0503***	0.0490***	0.0434***	0.0355***	0.0320***	0.0507***
Apr-18	0.300***	0.0980***	0.00363*	-0.0185***	-0.0258***	-0.0289***	-0.0365***	-0.0396***	-0.0392***	0.0718***
May-18	0.335***	0.137***	0.0408***	0.0226***	0.0159***	0.0180***	0.0148***	0.0156***	0.0210***	0.135***
Jun-18	0.381***	0.186***	0.0897***	0.0724***	0.0667***	0.0725***	0.0685***	0.0642***	0.0683***	0.128***
Jul-18	0.520***	0.249***	0.150***	0.132***	0.126***	0.127***	0.122***	0.113***	0.107***	0.0893***
Aug-18	0.406***	0.249***	0.167***	0.152***	0.145***	0.147***	0.141***	0.129***	0.124***	0.152***
Sep-18	0.365***	0.208***	0.123***	0.106***	0.0981***	0.0950***	0.0932***	0.0885***	0.0868***	0.110***
Oct-18	0.348***	0.111***	0.0195***	0.000105	-0.00638***	-0.00779***	-0.00705***	-0.0113***	-0.00573**	0.111***
Nov-18	0.433***	0.165***	0.0745***	0.0507***	0.0396***	0.0351***	0.0324***	0.0315***	0.0406***	0.169***
Dec-18	0.450***	0.208***	0.121***	0.103***	0.0973***	0.0954***	0.0944***	0.0915***	0.0963***	0.175***
Jan-19	0.436***	0.226***	0.130***	0.106***	0.0957***	0.0912***	0.0873***	0.0816***	0.0844***	0.187***
Feb-19	0.482***	0.233***	0.135***	0.113***	0.104***	0.102***	0.0970***	0.0919***	0.101***	0.146***
Mar-19	0.518***	0.189***	0.0834***	0.0624***	0.0534***	0.0533***	0.0486***	0.0433***	0.0486***	0.107***
Apr-19	0.518***	0.148***	0.0325***	0.00702***	-0.00575***	-0.00862***	-0.0156***	-0.0211***	-0.0181***	0.0394***
May-19	0.523***	0.213***	0.0928***	0.0663***	0.0524***	0.0498***	0.0466***	0.0441***	0.0570***	0.143***
Jun-19	0.454***	0.251***	0.142***	0.116***	0.103***	0.0976***	0.0928***	0.0782***	0.0775***	0.115***
Jul-19	0.291***	0.268***	0.185***	0.159***	0.147***	0.138***	0.131***	0.113***	0.100***	0.121***
Aug-19	0.185***	0.219***	0.191***	0.171***	0.162***	0.156***	0.148***	0.134***	0.117***	0.107***
Sep-19	0.152***	0.182***	0.139***	0.120***	0.107***	0.109***	0.0991***	0.0868***	0.0753***	0.139***
Oct-19	0.417***	0.183***	0.0723***	0.0458***	0.0302***	0.0286***	0.0165***	0.0120***	0.00837***	-0.00564
Nov-19	0.309***	0.179***	0.0740***	0.0542***	0.0437***	0.0457***	0.0345***	0.0296***	0.0230***	0.0468***
Dec-19	0.274***	0.175***	0.0967***	0.0816***	0.0706***	0.0721***	0.0626***	0.0574***	0.0476***	0.0415***
Jan-20	0.150***	0.114***	0.0662***	0.0584***	0.0553***	0.0651***	0.0616***	0.0613***	0.0524***	0.0636***
Mar-20	-0.0623***	-0.212***	-0.247***	-0.223***	-0.203***	-0.178***	-0.157***	-0.133***	-0.0945***	-0.110***
Apr-20	-0.498***	-0.748***	-0.807***	-0.758***	-0.673***	-0.565***	-0.466***	-0.391***	-0.297***	-0.161***
May-20	-0.477***	-0.716***	-0.694***	-0.556***	-0.451***	-0.376***	-0.325***	-0.288***	-0.241***	-0.113***
Jun-20	-0.283***	-0.280***	-0.249***	-0.198***	-0.173***	-0.154***	-0.141***	-0.145***	-0.145***	-0.133***
Jul-20	-0.173***	-0.185***	-0.157***	-0.131***	-0.113***	-0.108***	-0.108***	-0.118***	-0.126***	-0.134***
Aug-20	-0.00291	-0.0467***	-0.0792***	-0.0697***	-0.0564***	-0.0548***	-0.0577***	-0.0745***	-0.0831***	-0.129***
Sep-20	-0.0921***	-0.116***	-0.121***	-0.120***	-0.112***	-0.115***	-0.118***	-0.128***	-0.132***	-0.150***
Oct-20	0.0123	-0.0883***	-0.164***	-0.182***	-0.184***	-0.183***	-0.187***	-0.187***	-0.178***	-0.251***
Nov-20	-0.0276**	-0.0976***	-0.156***	-0.166***	-0.168***	-0.165***	-0.167***	-0.169***	-0.156***	-0.211***
Dec-20	0.167***	-0.00944*	-0.0845***	-0.101***	-0.101***	-0.102***	-0.110***	-0.118***	-0.119***	-0.153***
Jan-21	0.00927	-0.0508***	-0.0820***	-0.0874***	-0.0864***	-0.0809***	-0.0810***	-0.0842***	-0.0802***	-0.104***
Feb-21	-0.0425***	-0.0778***	-0.105***	-0.115***	-0.118***	-0.126***	-0.128***	-0.137***	-0.141***	-0.206***
Mar-21	-0.0183	-0.0508***	-0.131***	-0.145***	-0.152***	-0.156***	-0.156***	-0.158***	-0.143***	-0.178***
Apr-21	0.0770***	-0.0981***	-0.192***	-0.210***	-0.218***	-0.219***	-0.216***	-0.210***	-0.176***	-0.245***
May-21	-0.0471***	-0.181***	-0.257***	-0.252***	-0.248***	-0.245***	-0.245***	-0.245***	-0.235***	-0.280***
Jun-21	0.0251**	-0.0781***	-0.144***	-0.144***	-0.137***	-0.132***	-0.126***	-0.131***	-0.119***	-0.150***
Jul-21	0.0592***	-0.0424***	-0.0841***	-0.0818***	-0.0763***	-0.0745***	-0.0745***	-0.0856***	-0.0911***	-0.144***
Aug-21	0.281***	-0.00655	-0.0485***	-0.0451***	-0.0365***	-0.0403***	-0.0413***	-0.0528***	-0.0616***	-0.0802***
Sep-21	0.0542***	-0.0726***	-0.0872***	-0.0856***	-0.0834***	-0.0865***	-0.0936***	-0.108***	-0.119***	-0.172***
Oct-21	0.0569***	-0.0826***	-0.144***	-0.157***	-0.156***	-0.165***	-0.173***	-0.179***	-0.182***	-0.306***
Nov-21	0.0777***	-0.0366***	-0.112***	-0.124***	-0.125***	-0.131***	-0.136***	-0.141***	-0.141***	-0.273***
Dec-21	0.186***	0.0222***	-0.0496***	-0.0674***	-0.0683***	-0.0747***	-0.0824***	-0.0844***	-0.0750***	-0.183***
Constant	-0.436***	-0.223***	-0.105***	-0.0832***	-0.0730***	-0.0717***	-0.0659***	-0.0592***	-0.0574***	-0.0898***
Observations	216,084	198,283	182,654	191,321	195,579	203,413	210,419	220,076	230,947	255,744

Note: the table gives the proportionate change in incomes for each month compared to the predicted income in a scenario of no pandemic for that month. Standard errors are clustered at the household level. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

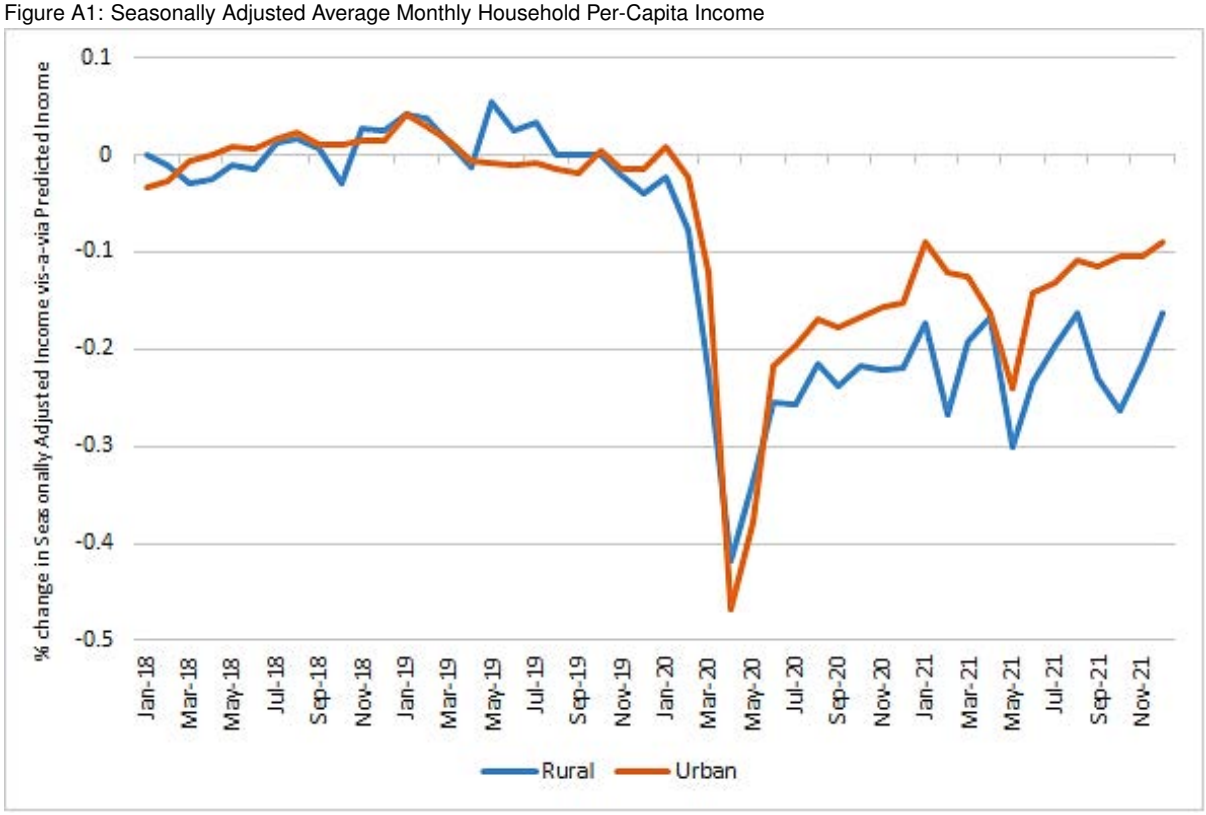
Table A12: Proportionate change in urban seasonally adjusted per capita income compared to the predicted income

	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Jan-18	0.0973***	0.0570***	0.0402***	0.0287***	0.0284***	0.0291***	0.0256***	0.0270***	0.0389***	0.0326*
Feb-18	0.0962***	0.0653***	0.0503***	0.0442***	0.0448***	0.0476***	0.0440***	0.0461***	0.0543***	0.0172*
Mar-18	0.109***	0.0795***	0.0662***	0.0649***	0.0644***	0.0708***	0.0651***	0.0615***	0.0718***	0.0304***
Apr-18	0.0947***	0.0682***	0.0633***	0.0611***	0.0594***	0.0669***	0.0658***	0.0628***	0.0704***	0.0429***
May-18	0.0973***	0.0736***	0.0711***	0.0666***	0.0648***	0.0723***	0.0706***	0.0687***	0.0783***	0.0585***
Jun-18	0.0822***	0.0653***	0.0654***	0.0609***	0.0601***	0.0701***	0.0702***	0.0686***	0.0828***	0.0633***
Jul-18	0.0762***	0.0615***	0.0636***	0.0620***	0.0612***	0.0727***	0.0734***	0.0761***	0.0942***	0.0831***
Aug-18	0.0904***	0.0749***	0.0725***	0.0648***	0.0641***	0.0731***	0.0729***	0.0788***	0.103***	0.100***
Sep-18	0.0741***	0.0652***	0.0670***	0.0585***	0.0571***	0.0649***	0.0655***	0.0721***	0.0950***	0.0812***
Oct-18	0.0775***	0.0701***	0.0696***	0.0601***	0.0576***	0.0672***	0.0663***	0.0717***	0.0906***	0.0698***
Nov-18	0.102***	0.0779***	0.0747***	0.0654***	0.0640***	0.0710***	0.0686***	0.0763***	0.0989***	0.0763***
Dec-18	0.0962***	0.0803***	0.0781***	0.0714***	0.0718***	0.0804***	0.0790***	0.0816***	0.102***	0.0834***
Jan-19	0.125***	0.106***	0.102***	0.0914***	0.0871***	0.0954***	0.0949***	0.101***	0.130***	0.113***
Feb-19	0.112***	0.104***	0.101***	0.0917***	0.0856***	0.0929***	0.0893***	0.0922***	0.117***	0.0932***
Mar-19	0.118***	0.0969***	0.0949***	0.0843***	0.0786***	0.0838***	0.0797***	0.0820***	0.101***	0.0731***
Apr-19	0.0895***	0.0663***	0.0598***	0.0527***	0.0556***	0.0660***	0.0632***	0.0618***	0.0782***	0.0589***
May-19	0.0904***	0.0633***	0.0552***	0.0483***	0.0506***	0.0592***	0.0540***	0.0553***	0.0709***	0.0636***
Jun-19	0.0884***	0.0595***	0.0523***	0.0467***	0.0485***	0.0596***	0.0555***	0.0573***	0.0750***	0.0529***
Jul-19	0.0973***	0.0745***	0.0619***	0.0521***	0.0517***	0.0619***	0.0577***	0.0599***	0.0806***	0.0545***
Aug-19	0.107***	0.0898***	0.0731***	0.0611***	0.0558***	0.0651***	0.0589***	0.0655***	0.0817***	0.0406***
Sep-19	0.111***	0.0927***	0.0759***	0.0651***	0.0601***	0.0654***	0.0599***	0.0603***	0.0725***	0.0291***
Oct-19	0.121***	0.0953***	0.0812***	0.0728***	0.0693***	0.0725***	0.0680***	0.0666***	0.0736***	0.0604***
Nov-19	0.114***	0.0888***	0.0771***	0.0698***	0.0677***	0.0687***	0.0645***	0.0616***	0.0634***	0.0159*
Dec-19	0.0661***	0.0469***	0.0460***	0.0459***	0.0451***	0.0490***	0.0477***	0.0435***	0.0469***	0.00964
Jan-20	0.0540***	0.0411***	0.0493***	0.0491***	0.0507***	0.0595***	0.0639***	0.0638***	0.0696***	0.0328***
Mar-20	-0.268***	-0.185***	-0.162***	-0.148***	-0.136***	-0.133***	-0.125***	-0.102***	-0.0834***	-0.0682***
Apr-20	-0.893***	-0.910***	-0.897***	-0.850***	-0.687***	-0.533***	-0.445***	-0.360***	-0.261***	-0.184***
May-20	-0.880***	-0.889***	-0.694***	-0.489***	-0.409***	-0.371***	-0.343***	-0.292***	-0.223***	-0.182***
Jun-20	-0.484***	-0.240***	-0.195***	-0.185***	-0.175***	-0.168***	-0.159***	-0.156***	-0.142***	-0.152***
Jul-20	-0.205***	-0.141***	-0.135***	-0.136***	-0.132***	-0.131***	-0.124***	-0.120***	-0.113***	-0.150***
Aug-20	-0.105***	-0.0912***	-0.0998***	-0.102***	-0.0924***	-0.0927***	-0.0859***	-0.0822***	-0.0775***	-0.132***
Sep-20	-0.0903***	-0.0823***	-0.0950***	-0.0999***	-0.0916***	-0.0931***	-0.0899***	-0.0846***	-0.0822***	-0.135***
Oct-20	-0.0805***	-0.0748***	-0.0835***	-0.0851***	-0.0800***	-0.0778***	-0.0761***	-0.0703***	-0.0707***	-0.134***
Nov-20	-0.0597***	-0.0618***	-0.0661***	-0.0667***	-0.0602***	-0.0585***	-0.0579***	-0.0523***	-0.0536***	-0.118***
Dec-20	-0.0513***	-0.0547***	-0.0597***	-0.0592***	-0.0527***	-0.0515***	-0.0523***	-0.0408***	-0.0377***	-0.127***
Jan-21	-0.0263***	-0.0187***	-0.0157***	-0.0160***	-0.00797***	-0.00937***	-0.0110***	-0.00296	0.000944	-0.0773***
Feb-21	-0.0307***	-0.0407***	-0.0549***	-0.0598***	-0.0590***	-0.0564***	-0.0456***	-0.0301***	-0.0129***	-0.0959***
Mar-21	-0.0625***	-0.0562***	-0.0703***	-0.0773***	-0.0724***	-0.0714***	-0.0636***	-0.0462***	-0.0188***	-0.0955***
Apr-21	-0.143***	-0.109***	-0.110***	-0.110***	-0.105***	-0.104***	-0.0900***	-0.0688***	-0.0409***	-0.120***
May-21	-0.630***	-0.308***	-0.222***	-0.195***	-0.176***	-0.165***	-0.141***	-0.103***	-0.0701***	-0.134***
Jun-21	-0.143***	-0.0958***	-0.0817***	-0.0832***	-0.0693***	-0.0647***	-0.0576***	-0.0429***	-0.0331***	-0.101***
Jul-21	-0.0614***	-0.0541***	-0.0518***	-0.0556***	-0.0457***	-0.0464***	-0.0401***	-0.0325***	-0.0272***	-0.0982***
Aug-21	-0.0356***	-0.0245***	-0.0234***	-0.0203***	-0.0117***	-0.00940***	-0.00539***	-0.00714***	-0.00222	-0.0767***
Sep-21	-0.0312***	-0.0199***	-0.0210***	-0.0151***	-0.00850***	-0.00923***	-0.00619***	-0.00764***	-0.00347	-0.0826***
Oct-21	-0.0330***	-0.0277***	-0.0253***	-0.0196***	-0.00729***	-0.00641***	-0.00356**	-0.00220	0.00466*	-0.0765***
Nov-21	-0.0245***	-0.0263***	-0.0252***	-0.0162***	0.000230	0.00138	0.00664***	0.00893***	0.0112***	-0.0766***
Dec-21	-0.00767	0.00176	-0.000904	0.00803***	0.0280***	0.0294***	0.0375***	0.0406***	0.0363***	-0.0587***
Constant	-0.103***	-0.0748***	-0.0679***	-0.0611***	-0.0597***	-0.0666***	-0.0644***	-0.0666***	-0.0820***	-0.0565***
Observations	446,910	429,112	412,584	409,130	397,848	401,366	402,769	409,431	422,587	412,932

Note: the table gives the proportionate change in incomes for each month compared to the predicted income in a scenario of no pandemic for that month. Standard errors are clustered at the household level. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

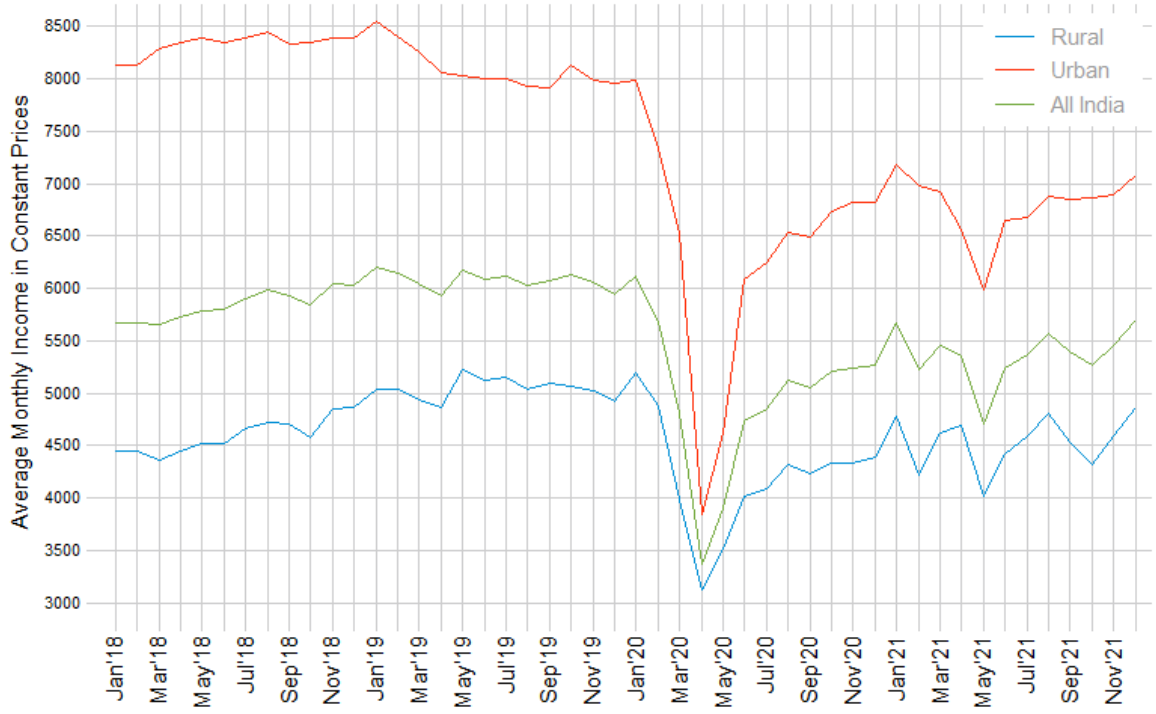
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure A1: Seasonally Adjusted Average Monthly Household Per-Capita Income



Note: The figure plots the change in average real monthly per capita seasonally adjusted household income for rural and urban sectors between Jan'18 and Dec'21, vis-a-via predicted incomes.
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

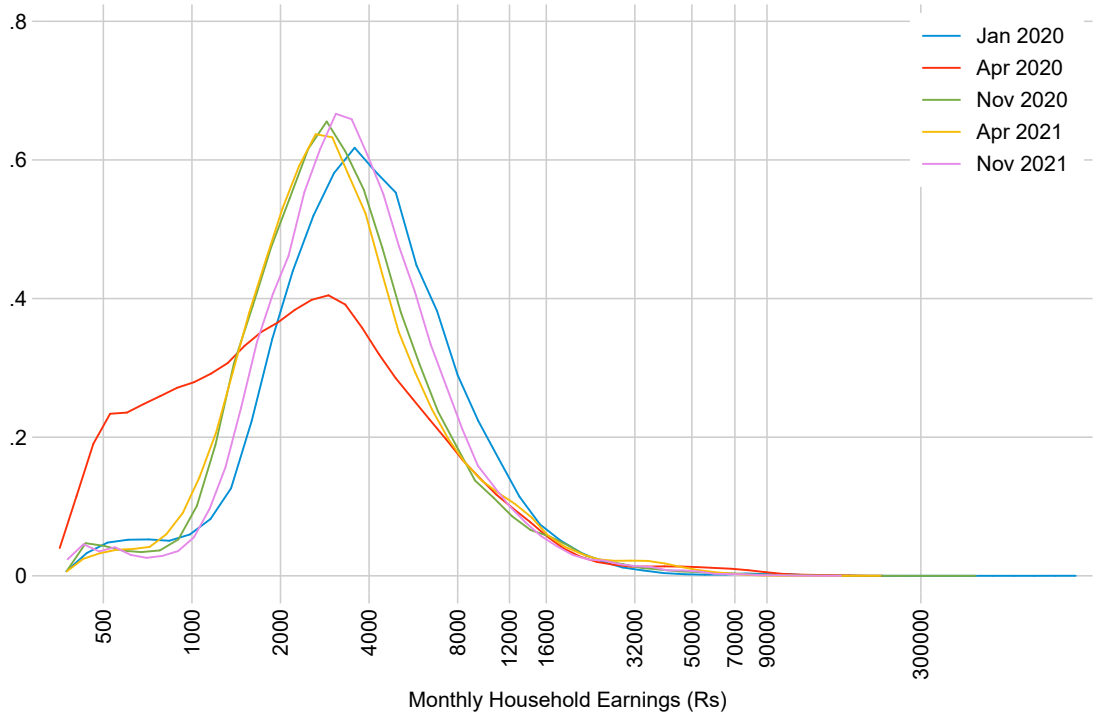
Figure A2: Seasonally Adjusted Average Monthly Household Per-Capita Income



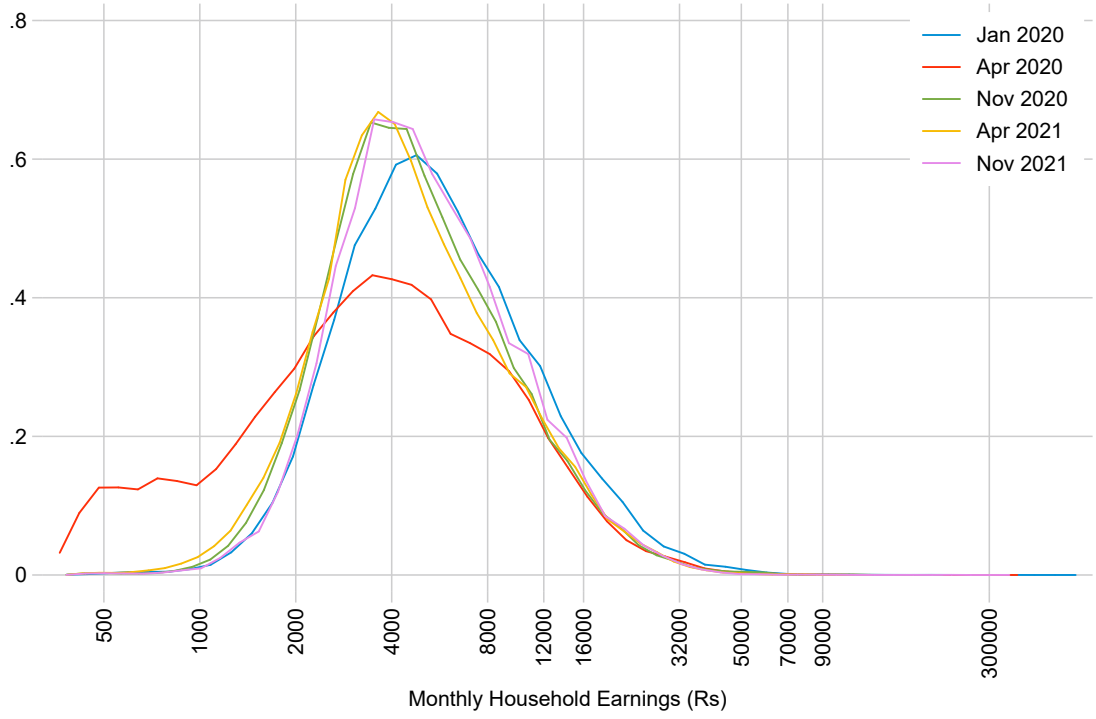
Note: The figure plots the average real monthly per capita seasonally adjusted household income for all- India, and rural and urban sectors between Jan'18 and Dec'21.
Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure A3: Distribution of income for select months

(a) Rural



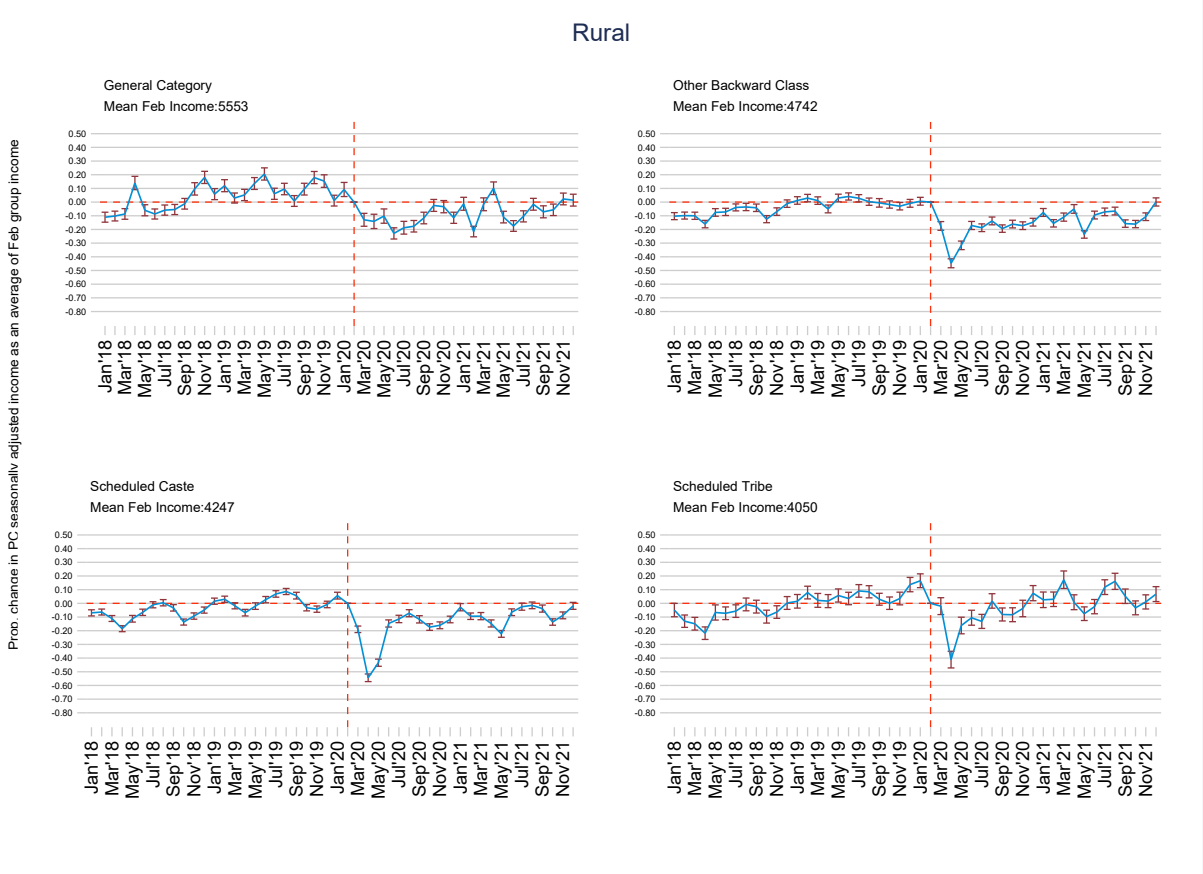
(b) Urban



Note: these are kernel density plots of average per capita household income for each percentile for the select months.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

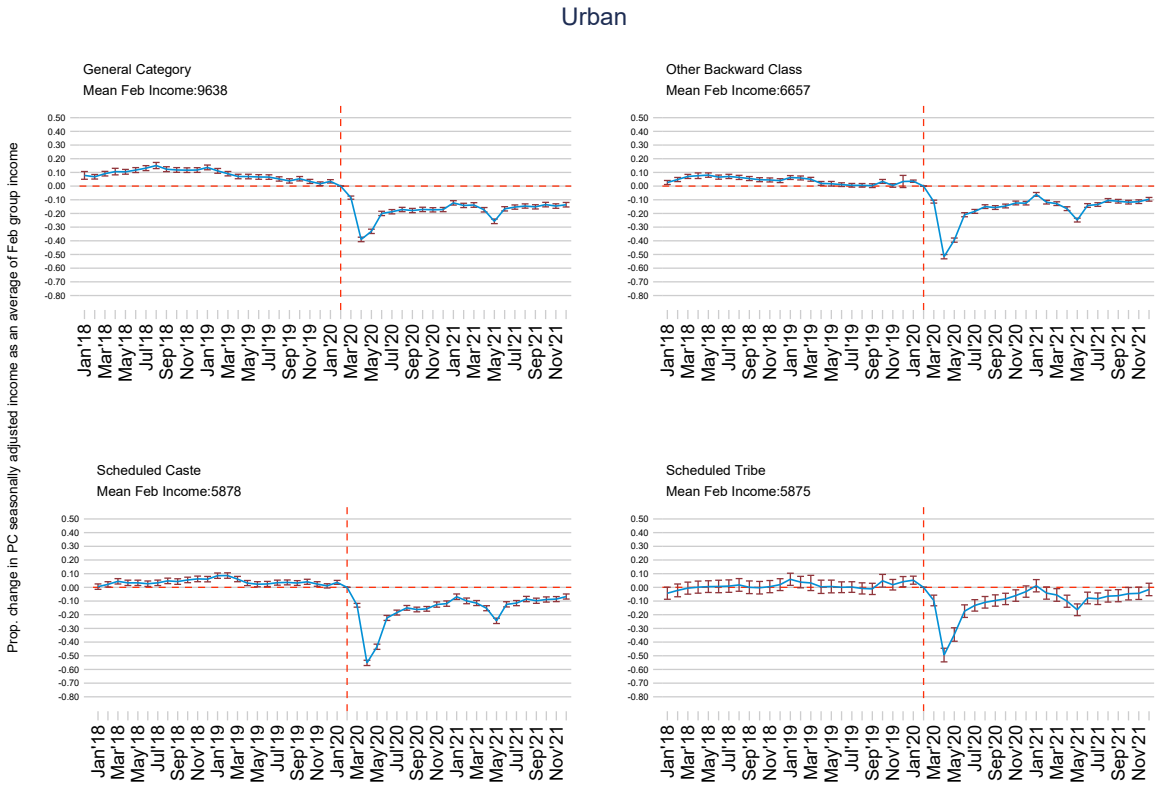
Figure A4: Change in rural average monthly household per capita income by caste



Note: the graph plots the proportionate change in per capita income estimated separately for the different caste categories in the rural sector using Equation 1. The estimates give the change in seasonally adjusted monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

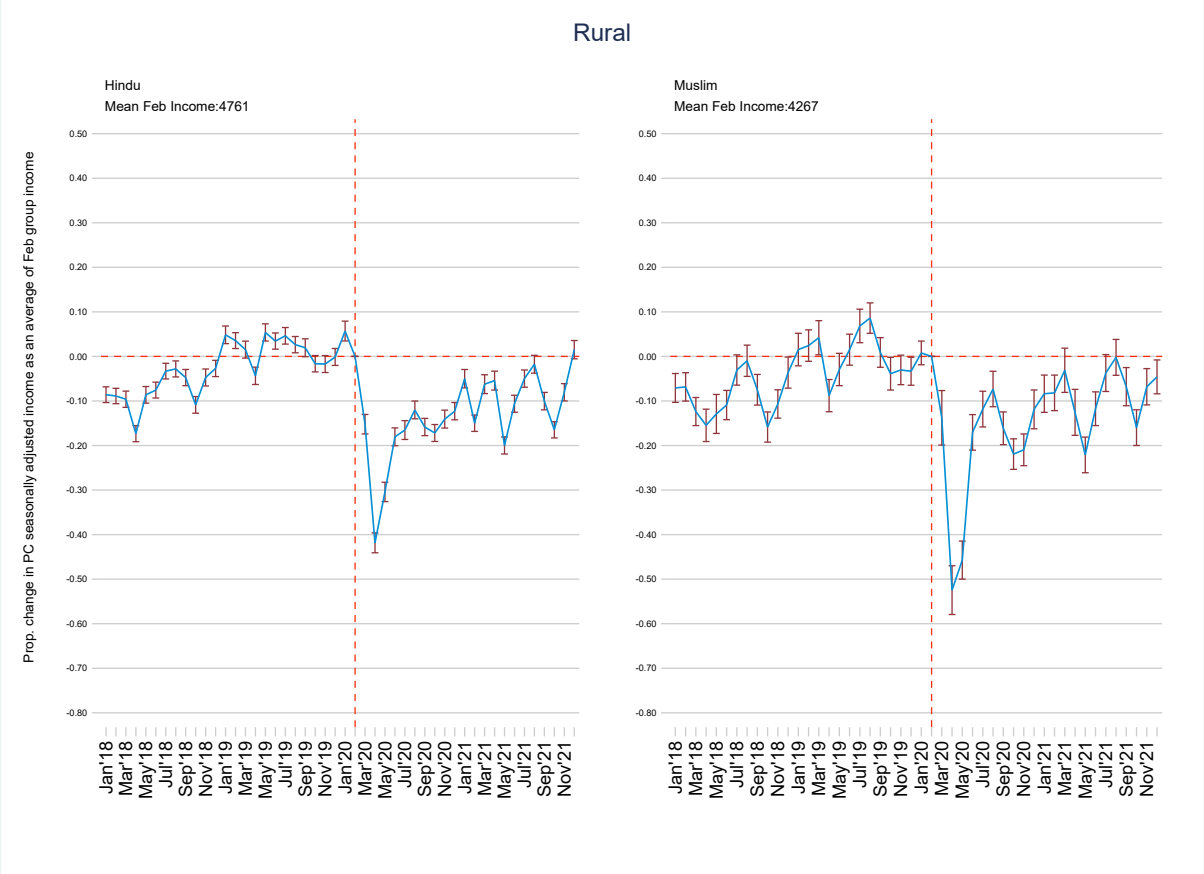
Figure A5: Change in urban average monthly household per capita income by caste



Note: the graph plots the proportionate change in seasonally adjusted per capita income estimated separately for the different caste categories in the urban sector using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

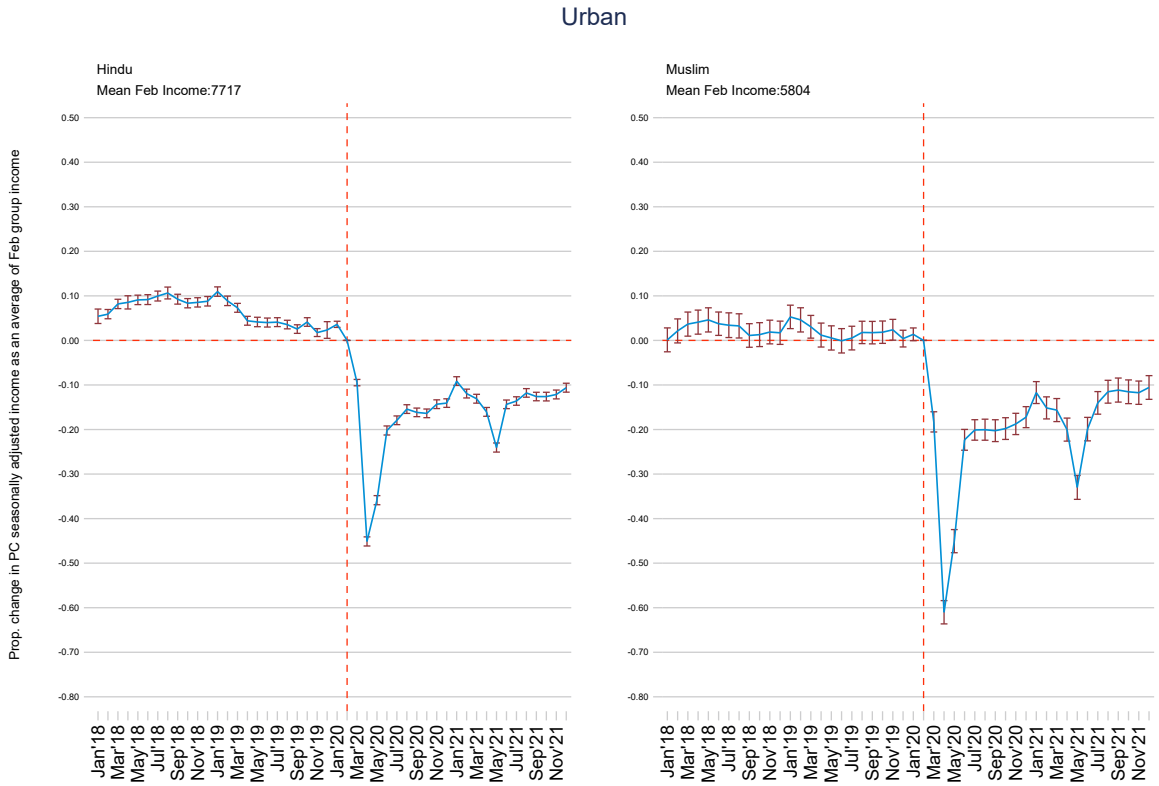
Figure A6: Change in rural average monthly household per capita income by religion



Note: the graph plots the proportionate change in per capita income estimated separately for Hindus and Muslims in the rural sector using Equation 1. The estimates give the change in seasonally adjusted monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

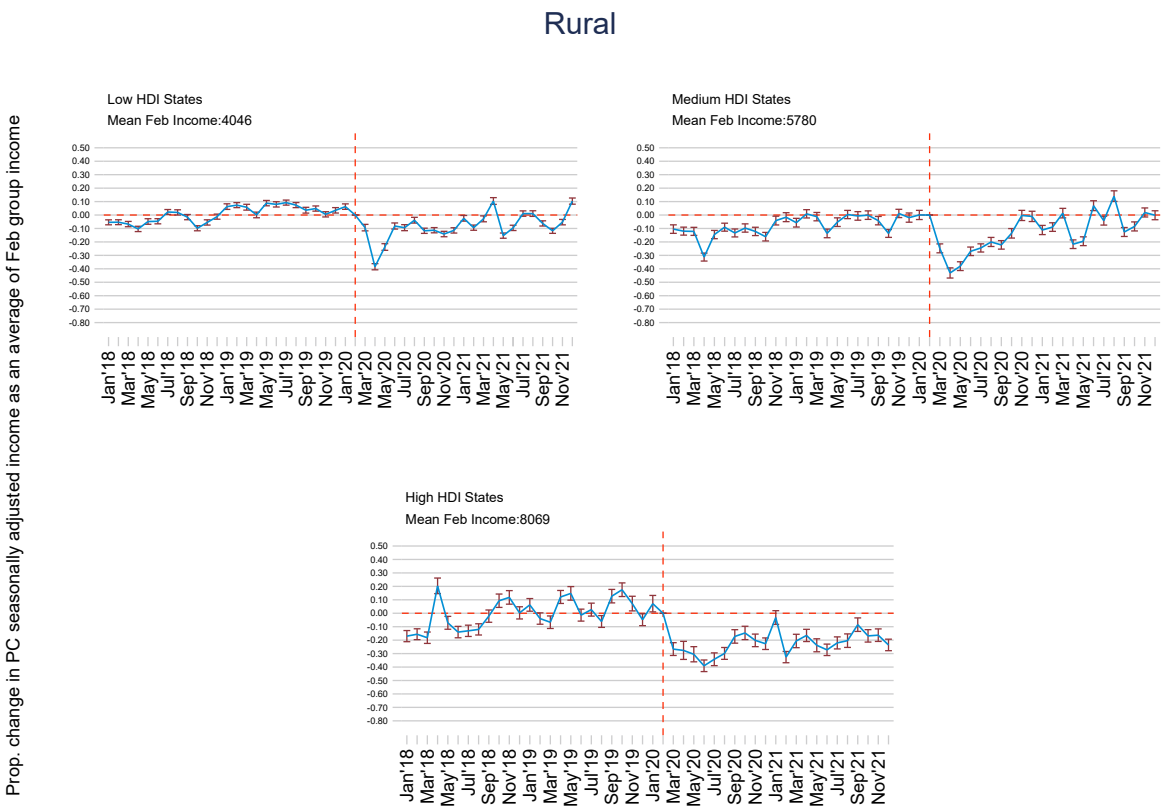
Figure A7: Change in urban average monthly household per capita income by religion



Note: the graph plots the proportionate change in per capita income estimated separately for Hindus and Muslims in the urban sector using Equation 1. The estimates give the change in seasonally adjusted monthly per-capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

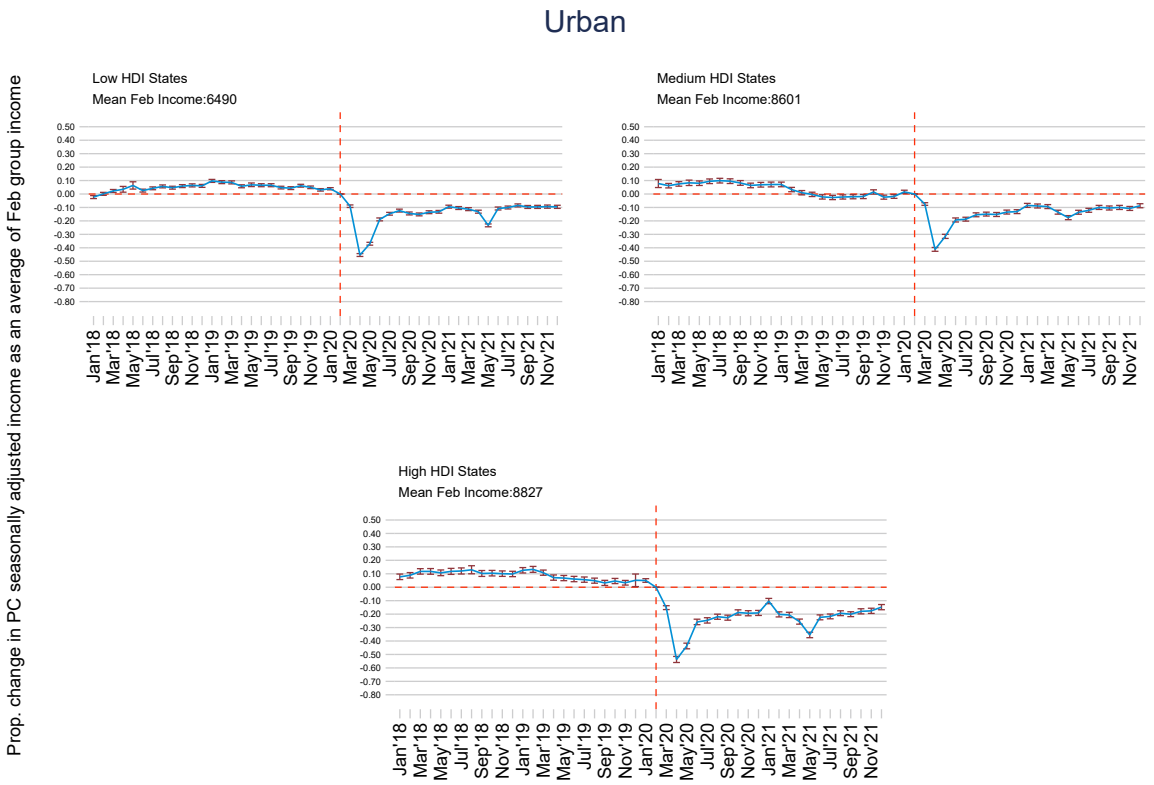
Figure A8: Change in rural average monthly household per capita income by states grouped by HDI



Note: the graph plots the proportionate change in per capita income estimated separately for low, medium, and high Human Development Index (HDI) in the rural sector using Equation 1. The estimates give the change in seasonally adjusted monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

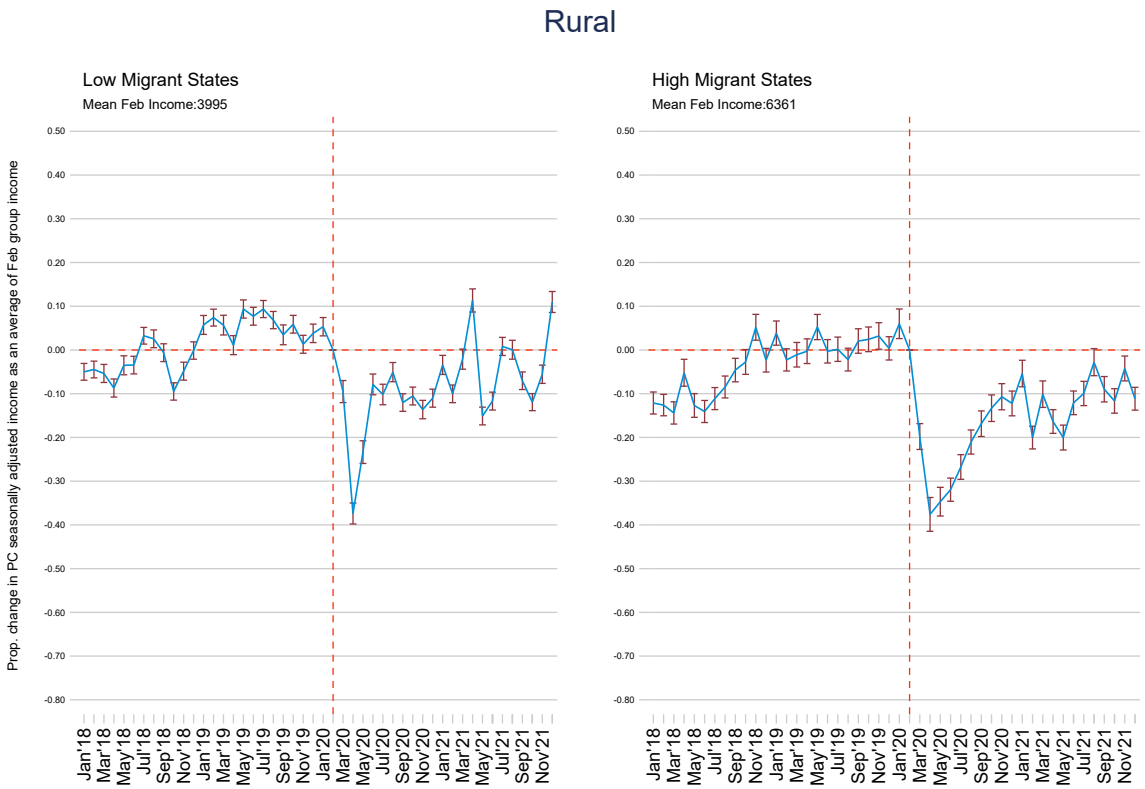
Figure A9: Change in urban average monthly household per capita income by states grouped by HDI



Note: the graph plots the proportionate change in seasonally adjusted per capita income estimated separately for low, medium, and high HDI in the urban sector using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

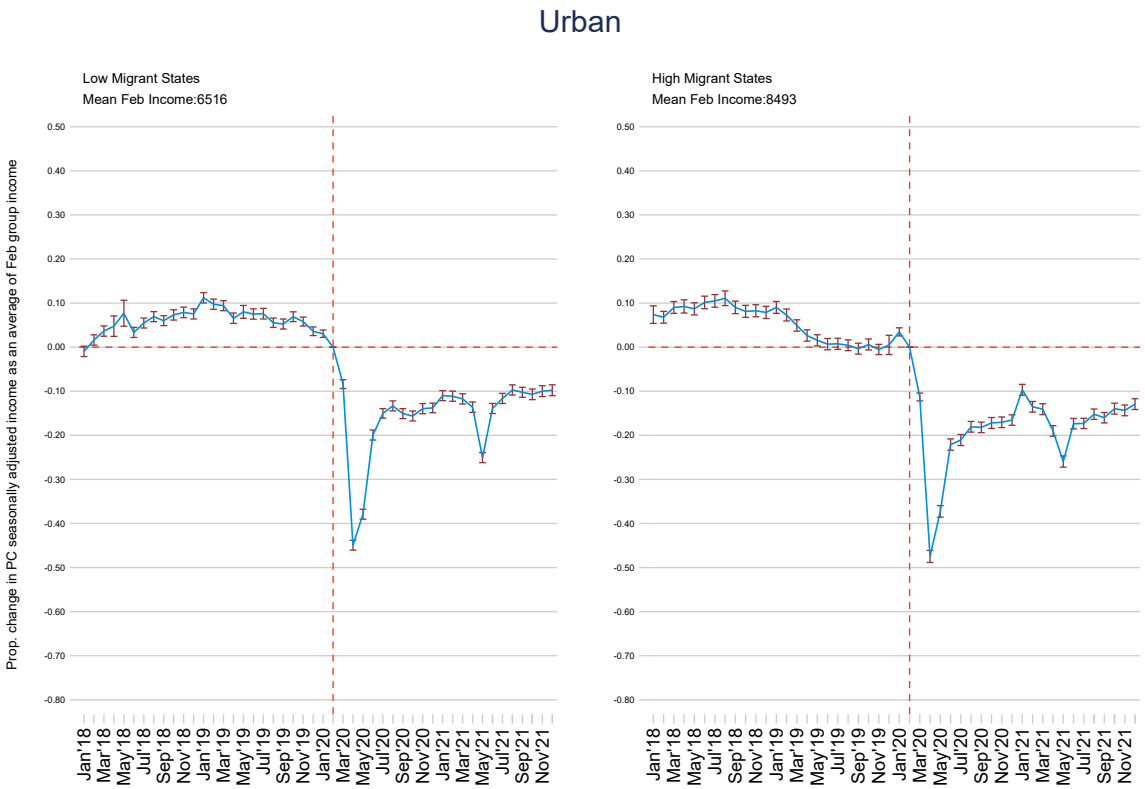
Figure A10: Change in rural average monthly household per capita income by percent of migrants in states



Note: the graph plots the proportionate change in per capita income estimated separately for the rural sector in states with low and high percentage of migrants using Equation 1. The estimates give the change in seasonally adjusted monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

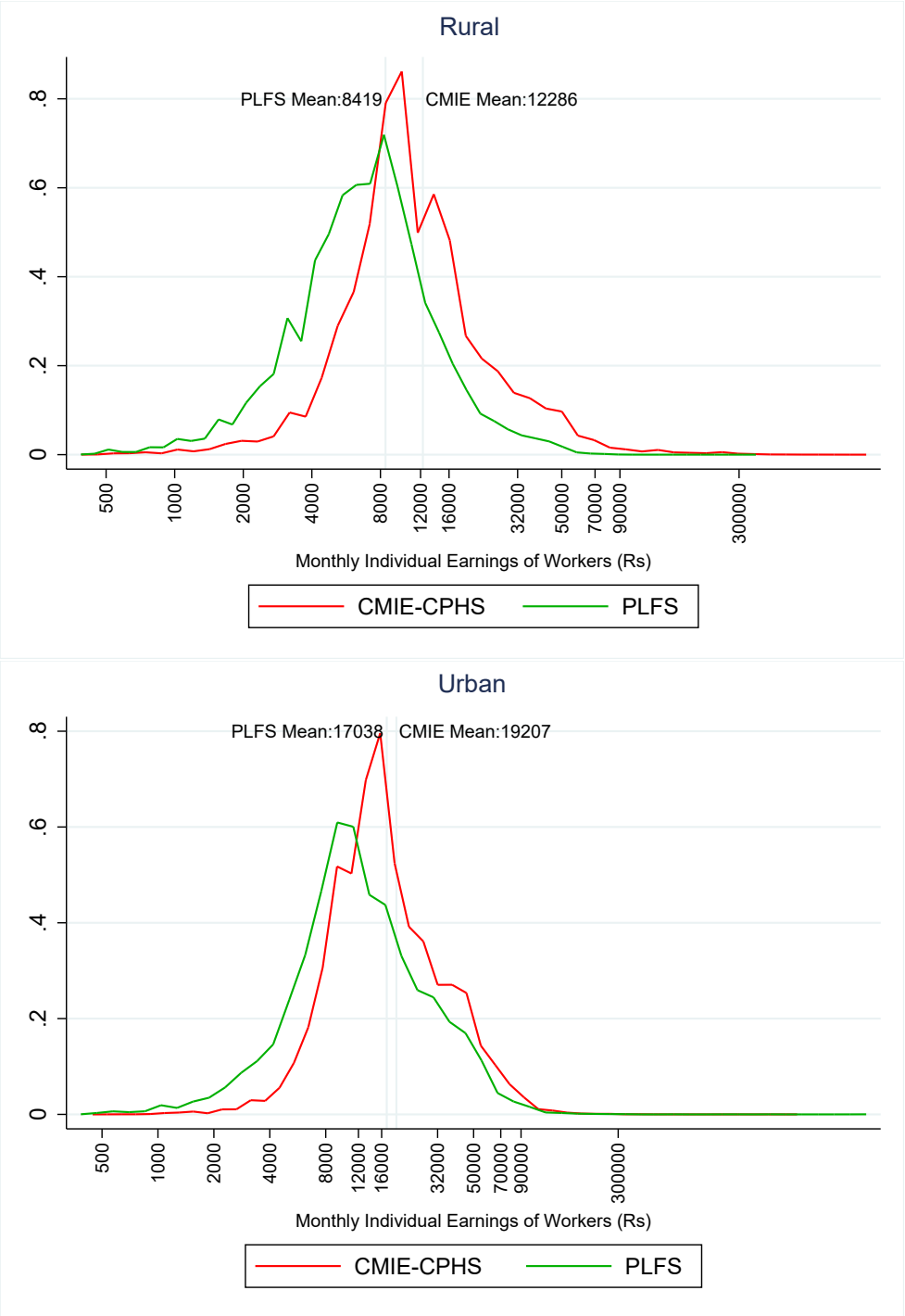
Figure A11: Change in urban average monthly household per capita income by percent of migrants in state



Note: the graph plots the proportionate change in seasonally adjusted per capita income estimated separately for the urban sector in states with low and high percentage of migrants using Equation 1. The estimates give the change in monthly per capita household income compared to February 2020, after controlling for household fixed effects. The estimates are reported along with their 95% confidence intervals. Standard errors are clustered at the household level.

Source: authors' calculations using Consumer Pyramid Household Survey data by CMIE.

Figure A12: Distribution of labour earnings in CPHS and PLFS



Note: these are kernel density plots of labour earnings in CPHS and PLFS, separately for the rural and urban sectors.

Source: Jha and Basole (2022); with permission.