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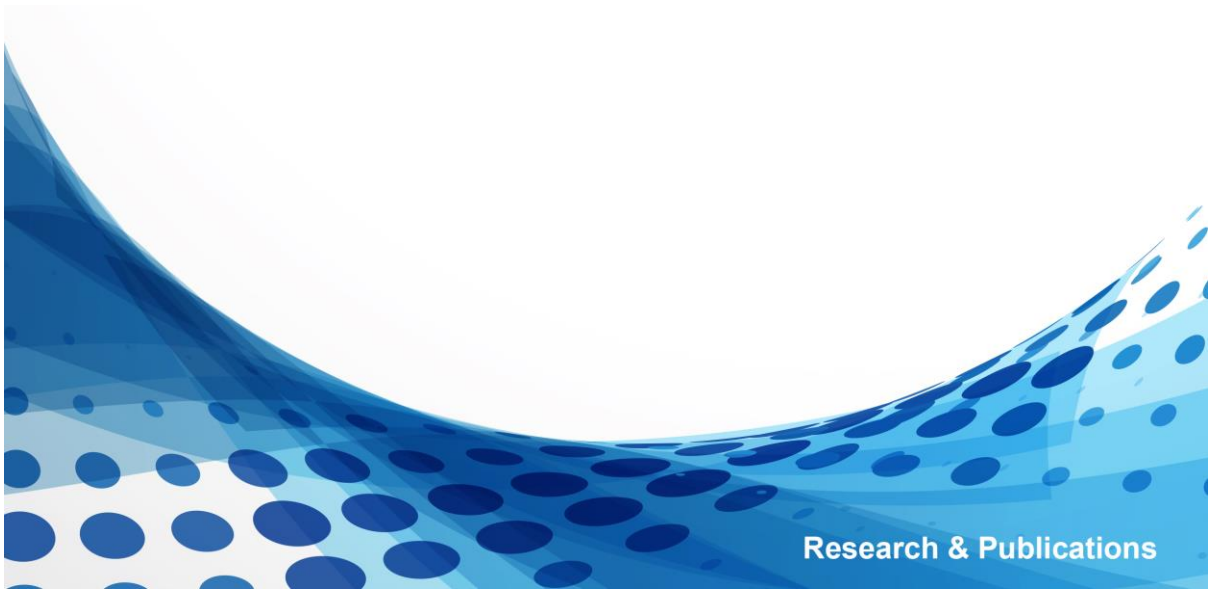

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# Gold in household portfolios during a pandemic: Evidence from an emerging economy*

Oindrila Chatterjee†, Balagopal Gopalakrishnan‡, and Sanket Mohapatra§

**Abstract**

This paper examines how Indian households allocate their savings portfolio across gold, financial assets, and cash during the COVID-19 crisis. Our study relies on an extensive household survey in 142 districts across 21 states in India conducted during the 2020-2021 financial year. We find that the portfolio allocation of households in districts with a higher incidence of COVID-19 shifted towards gold during the pandemic compared to households in other districts. The shift towards gold is accompanied by a shift away from financial assets and other assets (primarily cash). A similar shift towards gold is observed for districts that experienced the most adverse economic impact—as measured by lower night-time lights intensity—during the pandemic. Households in districts with greater banking access and better health infrastructure show a smaller shift towards gold. A panel estimation with normal and COVID-19 period surveys confirms the baseline results. Our findings contribute to a better understanding of the role of economic crisis in shaping the financial decisions of households.

*Keywords*: gold, portfolio allocation, household survey, COVID-19
*JEL classification*: D14; G11; G51

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# 1. Introduction

Gold is often considered as an important asset in a well-diversified portfolio of households. Lawrence (2003) finds that gold is less risky compared to stocks, bonds, and equities. Several studies have documented the role of gold as a safe haven during financial crises (Baur & McDermott, 2010; Bredin, Conlon, & Potì, 2015), stock market crashes (Baur & Lucey, 2010; Ming, Zhang, Liu, & Yang, 2020), and the COVID-19 crisis (Akhtaruzzaman, Boubaker, Lucey, & Sensoy, 2021). Households tend to reallocate their resources in response to unanticipated shocks to their income (Basten, Fagereng, & Telle, 2016; Betermier, Jansson, Parlour, & Walden, 2012; Knüpfer, Rantapuska, & Sarvimäki, 2017). Health shocks are among the most commonly reported types of shocks that affect households, along with natural disasters and loss of assets (Heltberg, Oviedo, & Talukdar, 2015). In this study, we examine whether an exogenous shock, specifically the COVID-19 pandemic, affects the allocation of household savings to gold in India.

The COVID-19 pandemic and the stringent measures to contain the disease disrupted the Indian economy besides taking an enormous toll on human lives (Beyer, Franco-Bedoya, & Galdo, 2021). As a result, the economy witnessed large declines in income of about 35% for salaried workers and 75% for daily wage earners during the pandemic (Gupta, Malani, & Woda, 2021). Paul, Patnaik, Murari, Sahu, and Muralidharan (2021) estimated the total loss incurred by households during the series of lockdowns at around 2.75% of the total gross domestic product of India. Besides the economic shock, heightened uncertainty during the pandemic altered the consumption and saving behavior of households. For instance, households' preference towards savings in equity investments diminished and relatively secure investment options were preferred (Gurbaxani & Gupte, 2021; Mushir & Suryavanshi, 2021).

Gold has traditionally been considered as a safe asset and store of value in India, the second largest emerging market economy (after China). It also plays a special cultural and socio-economic role for Indian households (Bhalotra, Chakravarty, & Gulesci, 2020; Menon, 2020; Mukherjee, Mukherjee, & Das, 2017). The consumption of gold in India

has doubled over the past two decades (Liu, 2016). Currently, India is the second-largest consumer of gold (in the form of jewellery) in the world (WGC, 2023). Ramadorai (2017) documents that the average Indian household invests a significant share of its wealth in gold, which is about 11% of its overall holdings.

In this study, we use an extensive household survey conducted during the 2020-21 financial year to examine how the portfolio allocation of household savings across three main assets—gold, financial assets, and other assets (primarily cash)—was affected by the geographical variation in the intensity of the COVID-19 pandemic across Indian districts.[1] The impact of the pandemic varied across different districts in India depending on several factors, such as their health infrastructure prior to the pandemic and the broader level of development. We capture the variation in the intensity of the crisis using two main indicators: COVID-19 cases per 1,000 population and satellite-based night-time lights intensity. We also examine portfolio allocation in terms of heterogeneity in financial access, the type of health infrastructure, and also prior gold holdings across districts. Additionally, we construct a panel of common households from representative surveys conducted in the pre-COVID-19 period (2015-16) and in the COVID-19 period to account for unobserved household-specific characteristics that may affect the portfolio allocation.

We find evidence that the portfolio allocation of households in COVID-19 vulnerable districts (CVD), the top-third of districts by COVID cases per 1,000 population, is tilted towards gold during the pandemic compared to households in other districts. The share of gold in household savings portfolios in the CVD districts is significantly higher (by 6.9 percentage points) than in other districts. This is accompanied by a shift away from financial asset holdings by 4.1 percentage points in the CVD districts. In a univariate analysis that compares a normal period (2015-16) and the COVID-19 period (2020-21), we observe that the wedge in the average gold share in household savings portfolios between the CVD and non-CVD districts rises substantially during the pandemic (see Figure 1). Results using panel data substantiate the cross-sectional regression and univariate findings. However, the observed effect of a 3.8 percentage points greater share

[1]The 2020-21 financial year in India is from April $1^{st}$ 2020 until March $31^{st}$ 2021.

of gold of household savings in CVD districts is lower in the panel estimation, as the latter controls for unobserved heterogeneity at the household level. The economic significance of the impact on higher allocation to gold in vulnerable districts (as compared to other districts) is substantial, ranging between 36% and 64% of the average gold share in household savings across various specifications.

Furthermore, it is likely that the measure of vulnerability based on COVID-19 cases used in our baseline analysis may not fully capture the vulnerability faced by the households. Hence, we also analyze the impact of the pandemic on household allocation to gold using an alternative indicator of district-level vulnerability that is based on economic activity levels in a district, as measured by night-time lights intensity (Beyer, Chhabra, Galdo, & Rama, 2018). The analysis shows a similar higher allocation towards gold in the CVD districts during the pandemic compared to less vulnerable districts. We find that households in districts with the lowest-third NTL intensity—indicating the most adverse economic impact during the pandemic—tend to have a 2.9 percentage points higher allocation to gold than other districts that were relatively less economically impacted.

As the allocation of household savings to gold and other assets can vary depending on underlying differences across districts, we examine how the district-level heterogeneity based on health infrastructure, financial access, and prior gold holdings affect the choices of households. We find that, despite the higher vulnerability from COVID-19, households in CVD districts with better access to health infrastructure have a relatively smaller allocation towards gold during the pandemic. Access to better health infrastructure moderates households' allocation to gold as superior health facilities may reduce the need for precautionary savings in safe assets.

Moreover, households in CVD districts with lower prior gold holdings (defined as the share of gold in household savings in a normal period) show a more pronounced shift to gold during the pandemic. It is likely that those households that have a lower share of savings in gold will have a higher appetite to save in gold during the pandemic owing to the uncertainty caused by it. Subsequently, we examine how access to financial institutions affects the share of households' gold savings during the pandemic. Greater

availability of bank branches and access to financial instruments may reduce the need for saving in safe assets such as gold. We find that the households' allocation towards gold savings in CVD districts is relatively smaller for those with better access to financial institutions. The allocation to gold in CVD districts is also greater for poorer households, who tend to be risk averse. Overall, our findings indicate that the portfolio allocation to gold, while higher for vulnerable districts, varies significantly based on other factors that can also affect the households' vulnerability during volatile times.

We conduct several robustness tests to validate our baseline findings. In addition to estimations using portfolio shares, we use amounts of each asset in household savings portfolios. It is possible that a change in the amount of total savings can lead to changes in the proportion of savings in gold, even if there is no change in the absolute amount of gold savings. To account for this possibility, we re-estimate our baseline regressions with amounts of each asset as the dependent variable and find that the amount allocated to gold in household savings is higher in the CVD districts compared to other districts. Our results establish that the portfolio shift occurs in both relative and absolute terms. Robustness checks using alternative definitions of vulnerability, where we have considered two different cut-offs for the CVD indicator based on the top quartile and the top quintile of districts recording the highest number of COVID-19 cases per 1,000 population, have also been done. The results for the estimations with alternative CVD indicators show a greater share of savings allocated to gold in CVD districts and are consistent with the baseline findings.

This paper makes several novel contributions to the literature. Prior studies have shown that gold acts as a safe haven during times of distress using commodity or country level data (Baur & Lucey, 2010; Baur & McDermott, 2010; Ming et al., 2020; Salisu, Raheem, & Vo, 2021). In contrast, our study uses household-level data to demonstrate the role of gold in household portfolio allocation during uncertain times. Our study complements other studies that have examined portfolio allocation during income shocks (Betermier et al., 2012; Frankenberg, Smith, & Thomas, 2003; Guiso, Jappelli, & Terlizzese, 1996; Palia, Qi, & Wu, 2009).

Secondly, our study is the first one—to the best of our knowledge—to analyze the effect of geographical variation in the intensity of the pandemic at the sub-national level on household portfolio allocation to gold using an extensive household survey conducted after the onset of COVID-19. In general, earlier studies that used survey data to examine the impact of the pandemic on economic outcomes either are relatively small-scale with a limited sample size (Gurbaxani & Gupte, 2021; Mushir & Suryavanshi, 2021); or are unable to establish causal inference given the use of only cross-sectional data (Belot et al., 2021); or consider consumption (Meyer, Murphy, & Sullivan, 2022) instead of changes to households' savings portfolios as we do. Finally, we are also able to validate the findings by drawing comparisons with a similar survey carried out during a normal period (2015-16). Panel data estimations using surveys during pre-COVID-19 and COVID-19 periods allow better identification and permit us to account for unobserved factors that could drive the results at a cross-sectional level. While some prior studies have explored optimal portfolio allocation at the macro level (Jondeau & Rockinger, 2006), our analysis is conducted at the household level to understand the effect of an exogenous shock on savings portfolio allocation behavior.

The remainder of our paper is organized as follows. Section 2 provides a review of the prior literature relevant to household portfolio allocation, the effect of economic shocks on the same, and the role of gold during crisis periods. The next section describes the data and empirical strategy employed in our analysis. Section 4 presents our baseline and additional results and discusses the findings. Robustness tests are presented in Section 5. Section 6 concludes with potential insights, policy implications, and directions for future research.

## 2. Literature review

A large body of research has studied the antecedents of households' financial decisions. However, the relationship between economic shocks and household portfolio allocation especially to gold is relatively under-researched. This section provides a review of the

related literature on household portfolio allocation, economic shocks, and role of gold during crisis.

### *2.1. Household portfolio allocation*

Household investment decisions are primarily shaped by time effects (for instance, inflation expectations, risk-return preferences), age effects (age of household), and demographic effects (income, race, education, etc.) (Campbell, 2006; Poterba & Samwick, 2003). Bertaut and Starr (2000) illustrated that factors such as age and wealth structure influence household portfolios in the US. The paper finds that higher income households and college-educated households show a greater tendency to hold risky assets, while self-employed and retired households hold more conservative assets. The inertia in household asset allocation is discussed by Brunnermeier and Nagel (2008) who observe that the share of risky liquid assets of American households is not affected by wealth changes, in fact households re-balance their portfolio slowly to be cost effective. Ghilarducci, Radpour, Fisher, and Webb (2016) use the 2008 Survey of Income and Program Participation (SIPP) data to show that 32% of low income families use retirement savings as an insurance against shocks, compared to moderate and higher income ones.

Diversification of portfolios—implying allocation of funds across difference assets with different risks—also mirrors perceptions of the financial market. Accumulating assets over the life-cycle and spending them as households age is not likely to be true for all categories of assets. Financial assets sometimes display an opposite pattern owing to its higher liquidity (Poterba & Samwick, 2001). Chen and Song (2022) use structural equation modeling to illustrate that households' tendency to hold risky financial assets is determined by the total financial assets owned, risk investment intentions, and financial market knowledge. Malmendier and Nagel (2011) explain how recent market returns shape the preferences of individuals towards certain assets. The findings draw evidence from low stock-market participation of young households in the early 1980s, following the disappointing stock-market returns in the 1970s, and the relatively high participation of young investors in the late 1990s, following the market boom in early 1990s. In a

study conducted in Thailand, the researchers found that though financial assets yielded higher returns, households tended to avoid them due to high risk, complicated investment procedures, and need for large initial investment (Suppakitjarak & Krishnamra, 2015). Hochguertel, Alessie, and Van Soest (1997) find that besides the level of financial wealth, marginal tax rate plays a key role in household allocation between risky and risk free assets.

### *2.2. Economic shocks and flight-to-quality*

Prior studies have discussed the asset allocation behavior of households in response to income shocks in different countries. Betermier et al. (2012) find that higher wage volatility of Swedish households is associated with lower exposure of households to risky assets. Basten et al. (2016) find that as the perceived likelihood of job losses increases, Norwegian households shift their asset allocation towards safer assets. Similarly, during the Finnish depression in 1991-93, adversely affected households were less likely to invest in risky assets (Knüpfer et al., 2017). In a study of Italian households, Guiso et al. (1996) observe that investment in risky assets responds negatively to income risk. Palia et al. (2009) report a similar finding for U.S. households. Frankenberg et al. (2003) capture the diversity of household behavior during the Asian financial crisis. The authors find that during the crisis some households reduced expenditures on semi-durables, keeping spending on food consistent, while others, especially rural ones, fell back on gold to smoothen consumption. Rise in unemployment post any crisis also presented unequal cashing out behaviors across different income groups. Therefore, during financial downturns investors exhibit a herding behavior and shift out from risky assets to relatively "safer" ones, which are considered to be of higher "quality" during crisis. Chang and Hsueh (2013) find evidence of flight-to-quality effects from volatile stocks to relatively conservative long term government bonds in the Asia-Pacific region during the financial crisis. As asset returns become more negatively correlated with volatility, the preference to rebalance portfolios towards more liquid securities simultaneously increases (Vayanos, 2004).

While studying the asymmetric impact of health events on asset allocation, Berkowitz

and Qiu (2006) investigate how a health event can lead to restructuring of household portfolios. The paper empirically shows how diagnosis of a new disease results in a greater decline in financial wealth of households compared to non-financial wealth. Exogenous factors such as the COVID-19 pandemic affect household consumption, resource allocation and input choices. In a micro-level study of households in Uganda, Mahmud and Riley (2021) found that affected households responded to income shocks by exhausting almost 50% of their savings and borrowing during the COVID-19 pandemic, but did not liquidate fixed assets or sell livestock. In a small-scale survey involving 184 residents of the city of New Delhi and Mumbai, Mushir and Suryavanshi (2021) observe that the preference of investors shifted towards more conservative assets during COVID-19. These findings are in line with Carter and Lybbert (2012) who conclude that while some households will sell assets to offset stochastic income loss, others will guard assets even in face of financial adversities. Cantor and Landry (2020) find that lower-income households in the United States resorted to savings, skipped bill payments (partially or fully), and filed taxes to obtain a refund, in order to navigate the financial impact of COVID-19. Fox and Bartholomae (2020) recommend the urgency of financial planning to enable households to survive the transitory or permanent shocks of the pandemic. On the contrary, Hanspal, Weber, and Wohlfart (2021) observe that there was no active tendency within households to re-balance portfolios in response to the stock market crash following the pandemic. Instead, it led to adjustments in expectations about household debt and labour market participation.

### *2.3. Role of gold during crisis*

Baur and McDermott (2010), Baur and Lucey (2010), and Bredin et al. (2015) find that gold acts as a safe haven during sudden negative financial market shocks, such as the 1987 stock market crash and the 2007-2010 U.S. financial crisis. Gürgün and Ünalmış (2014) find that gold performed as a safe haven for domestic investors particularly in developing economies and emerging markets. Aggressive allocation to gold has yielded better returns since the financial crisis of 2007 compared to earlier economic contractions during 1980s

and 1990s (Emmrich & McGroarty, 2013). Ming et al. (2020) find that gold was a strong safe haven for domestic investors in China during negative stock market conditions and crashes. An analysis for the pre-COVID and COVID-19 periods confirms the ability of gold to serve as a safe haven instrument during the pandemic compared to other financial assets such as U.S. stocks and other precious metals such as silver, palladium and platinum (Salisu et al., 2021). Akhtaruzzaman et al. (2021) show that gold served as a safe haven asset for stock markets during the initial phase of the COVID-19 pandemic, and a "flight-to-safety" asset during later phase of the crisis when investors' portfolio allocation shifted towards gold. However, other studies have presented contrasting findings. Baur and Glover (2012) empirically show that significant investment in gold during the sub-prime crisis and Lehman bankruptcy of 2008 diminished its safe haven property. Sahay and Jain (2021) investigated portfolio allocation during periods of sub-par economic growth (GDP growth below 6%) and found instances of hyperbolic discounting—where people invest more in equities instead of gold as equities provide better returns in the short-term especially in non-crisis times.

# 3. Data and Methodology

## *3.1. Data*

This section describes the data used for the analysis. We draw the data from various sources, which include representative household-level surveys, district-level data on the incidence of COVID-19, and gross value added (GVA) at the district-level. We describe the data in detail below. Other alternative data used in our study as part of the robustness are described in the respective sections.

### *3.1.1. Household survey data*

Our data is based on a unique and extensive household survey—the Household Survey of Gold Consumption—conducted by India Gold Policy Centre (IGPC) and People Research on India's Consumer Economy (PRICE) during the COVID-19 period in 2020-21 financial

year. The survey was carried out for 40,427 households across 160 districts in 23 states in India. Based on data availability for variables used in the analysis, a sample of 21,611 households in 142 districts in 21 states is used in the estimations. To compare the changes in household gold savings, we have also used a prior representative survey carried out by PRICE in the 2015-16 financial year. Figure 2 shows the average share of household gold savings aggregated at a state level for both the pre-COVID period (2015-16) and the COVID-19 period (2020-21). The figure indicates a substantial increase in the share of gold savings in several states, particularly in the central and southern parts of the country, during the pandemic. We constructed a two-period panel data of 4,629 common households across 119 districts and 19 states between the two surveys. Based on data availability for variables used in the analysis, a smaller subset of 2,647 households across 98 districts in 17 states was used in the estimations.

For the ease of interpretation of results, we categorize the household savings during the 2020-21 financial year into three distinct categories. The first category is gold, which includes resources allocated to both physical gold and digital gold. The second category is financial assets, which includes investments in fixed deposits and savings accounts in both banks and post offices, investments in stocks, derivatives, Self Help Groups, chit funds, credit and thrift groups, and investments in life insurance (LIC). The third category is a miscellaneous category that primarily comprises cash holdings at home.[2] Gold constitutes about 11% of the savings of an average household in our sample. Financial assets account for approximately 65% percent, while other assets account for 24% percent of the portfolio (see Figure 3 and Table 2).

### *3.1.2. COVID-19 data*

Data on the number of COVID-19 cases at the district level was obtained from the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG) database by Development Data Lab. The data reports a daily count of real-time COVID-

[2]Savings in cash is about 90% of this category, while savings in real estate and precious stone jewellery other than gold are the other relatively smaller components, making up the remaining 10%.

19 cases. For our paper, we aggregated the daily count to monthly and further to yearly to match the frequency of the IGPC-PRICE household survey 2020-21. Average COVID-19 cases per 1,000 population have been calculated by dividing the average cumulative annual cases by the average population of the district in 2020. Figure 4 shows the average COVID-19 cases per 1,000 population in a state during the financial year 2020-21 (April $1^{st}$ 2020 to March $31^{st}$ 2021). The figure shows a significant variation in the incidence and spread of the pandemic across states in India. The southern states in India have a higher incidence compared to the northern parts of the country.[3] A detailed description of the data, variable construction, and the sources are mentioned in Table 1.

#### *3.1.3. Summary statistics*

The summary of the data employed in the study is shown in Table 2. The average household in our sample has an income of 438,011 Indian rupees per annum. The median household has about four members. The average age of the household head is 43 years and more than 80% of the household heads in our sample are male and about 89% of the household heads are married. Only 14% of the household heads are college educated, indicating a lower level of education for the majority surveyed. Rural households account for 38% of our sample. The average district in our sample registered a growth rate of 9.4% in the year (2019-20) prior to the onset of COVID-19. Services contribute the highest—about 52%—to the district growth rates.

### *3.2. Empirical strategy*

This section discusses the empirical methodology employed to analyze the variation in the allocation of financial resources by households. It also presents the panel estimations to determine the shift towards safer assets during the COVID-19 pandemic compared to the pre-COVID period.

[3]The average COVID-19 cases for states that are not part of our sample are not shown in the figure.

### *3.2.1. Cross-sectional analysis*

The analysis is conducted for the sample of households surveyed in the 2020-21 financial year to analyze the effect of the COVID-19 pandemic on household asset allocation. The estimation equation is as follows:

$$Asset\_sh_{i,k} = \alpha + \beta CVD_k + \delta_1 X_i + \delta_2 Y_k + \epsilon_{i,k} \tag{1}$$

*Asset_sh* is the dependent variable indicating the percentage share of gold, financial assets, and other assets in total savings of household $i$ in district $k$. Our main variable of interest is the COVID-19 vulnerable districts (CVD), which is a dummy variable taking on a value of 1 for the top one-third districts with the highest number of COVID-19 cases per 1,000 population, and 0 for the bottom two-thirds districts. The top tercile of the districts accounts for more than half (60.6%) of COVID-19 cases in the estimation sample. $X$ is a vector of household-level controls presented in Table 1. They include the following set of variables: log of total household income, number of female members, household size, an indicator for the sector in which the household belongs, age of household head, an indicator for male-headed households, an indicator for married household head, and an indicator for college-educated household heads. $Y$ is a vector of district-level controls that include the growth of per capita gross value added (GVA), and the shares of agriculture, industry, manufacturing, and services sector in district output.[4] Heteroscedasticity-consistent robust standard errors are clustered at the block level, which are the administrative subdivisions of the respective Indian districts, in all estimations.

### *3.2.2. Panel data estimations*

In this section, we present the methodology for a panel data estimation which allows us to account for unobserved heterogeneity across households. The estimations also

[4]The remaining share of district-level GVA comprises sectors such as mining and quarrying, fishing, forestry, and construction.

allow us to draw causal inference on the household allocation choices during a crisis period compared to a normal period. For this purpose, we construct a panel of common households surveyed in both 2015-16 and 2020-21. We conduct the following estimation with the panel data:

$$\begin{aligned} Asset\_sh_{i,k,t} = & \alpha + \beta_0 COVIDperiod_t + \beta_1 COVIDperiod_t * CVD_k \\ & + \delta_1 X_{i,k,t} + \delta_2 Y_{k,t} + \gamma_i + \mu_s + \epsilon_{i,k,t} \end{aligned} \tag{2}$$

Our dependent variable $Asset\_sh_{i,k,t}$ are the Gold share, Fin. assets share, and Other share, which are the percentage shares of portfolio holdings of household $i$ in district $k$ at time $t$. $COVIDperiod_t$ is a COVID-19 indicator that takes on the value 1 for the COVID-19 time period (2020-21), and 0 otherwise (2015-16). $CVD_k$ takes on a value 1 for the top one-third of districts with the highest number of COVID-19 cases per 1,000 population, and 0 for the bottom two-thirds of districts. Therefore, the households in the top one-third of districts with the highest number of cases per 1,000 population are the 'treatment' group and households in other districts are the 'control' group. $\beta_1$ captures the incremental allocation to gold and other assets during the pandemic period (relative to the normal period) in the COVID-vulnerable districts compared to other districts. $X_{i,k,t}$ is a vector of controls for household $i$ in district $k$ at time $t$ similar to the baseline estimation. $Y_{k,t}$ is the set of controls for district $k$ at time $t$. $\gamma_i$ and $\mu_s$ represent the household-level and state-level fixed effects respectively. Fixed effects are used to control for heterogeneity at household and state levels. As household fixed effects subsume time-invariant features (such as the district-level CVD indicator), the estimations are conducted separately without and with household fixed effects. Heteroscedasticity-consistent robust standard errors are clustered at the block level in all estimations, similar to earlier.

# 4. Results

## *4.1. Baseline results*

In this section, we present the results of the estimations described in the earlier section. The results of the baseline estimation are shown in Table 3. We find that the proportion of gold savings in households located in COVID-vulnerable districts (see coefficient of $CVD$ in column (1)) is significantly larger than in other districts during the pandemic period.

The allocation of household savings to gold in the COVID-vulnerable districts is 6.9 percentage points higher than in other districts. The greater allocation towards gold observed for the vulnerable districts is about 70% of the mean share of gold savings of the average household in our sample, hence, the effect is substantial. Interestingly, the higher allocation to gold has been from other financial assets, in which we see a significant drop in holdings. We also find a significantly higher allocation to safer assets such as gold from other assets that include cash and fixed and illiquid assets such as real estate (see column (3)). The observed higher allocation to gold savings in CVD districts provides support to the argument that gold serves as a hedge during heightened uncertainty during crisis episodes. It is likely that the increased health risk and the potential tail risk faced by the households during the pandemic encouraged them to invest more in gold.

The fall in financial assets—which includes bank deposits—can be potentially explained by frequent cash withdrawals to meet emergency health and economic needs. The lack of credit access during the pandemic could have exacerbated the depletion of household savings. This is consistent with Szustak, Gradoń, and Szewczyk (2021) who find that there was a fall in household savings of Polish households during the pandemic, on account of their reluctance to obtain loans.

The estimation coefficients of the control variables are as expected. An increase in household income during the COVID-19 period is associated with a decrease in the share of gold savings. This suggests that higher-income households are likely to have

greater access to a range of saving options and shift away from gold as their income increases. Additionally, households with a higher number of female members and those with a college-educated household head allocate more of their savings to gold. While the education of the household heads, the size of the household, and household income positively affect the proportion of financial asset holdings, this allocation is negatively related to the proportion of female members. The socio-cultural factors linked to gold and gender preferences are likely accentuated in such households.

The larger negative association between the share of the manufacturing sector in district GVA and gold savings (as compared to the coefficient for agricultural share) implies that households in relatively developed districts have a lower share of gold in overall savings. By contrast, an increase in district GVA per capita is accompanied by an increase in household gold holdings.[5] This is plausibly due to regional variation, as both GVA per capita and average gold holding tend to be higher for districts belonging to Southern states in India, particularly Karnataka, Telangana, and Kerala.

The above findings are consistent with prior findings that gold acts as a safe haven during negative market shocks (Baur & McDermott, 2010). Historically gold has acted as a buffer against a decrease in purchasing power and inflation. Hence, the adverse effect of the pandemic and the associated uncertainties coupled with inadequate healthcare access could have driven the households to safer assets. In further estimations presented in a subsequent section, we explore how households' gold savings react to heterogeneity in access to healthcare.

### *4.2. Alternative indicators of vulnerability*

In this section, we validate the findings using two alternative indicators of vulnerability: a continuous variable for COVID-19 cases per 1,000 population and night-time lights (NTL) intensity. NTL has been used in recent studies as a measure of economic activity, with

[5]The pairwise correlation between the log of household income and the log of district GVA per capita is low in our sample (0.27). Hence, including both variables in the analysis is not likely to generate problems of multicollinearity.

a higher intensity of night-time lights associated with greater economic activity in that particular area (Beyer et al., 2018, 2021).[6] In our study, the NTL data is used to gauge the differential impact of the pandemic-induced economic uncertainty on household savings portfolios across Indian districts. Our main variable of interest is *NTL_Low*, which is a dummy variable that takes the value of 1 for the bottom-third of districts that recorded the lowest night-time lights intensity between April 2020 and March 2021.

The results of the estimations are shown in Table 4. Columns (1)-(3) show the results with COVID-19 cases per 1,000 population as the explanatory variable. The results are consistent with the baseline findings. Higher the number of COVID-19 cases per 1,000 population in a district, the higher the proportion of the gold share of household savings. We also find that the allocation of savings to financial assets and other assets such as cash is lower for districts with higher incidences of COVID-19.

The results of the estimations with NTL as the explanatory are shown in columns (4)-(6). The results are consistent with the baseline results on the effect of the pandemic on gold savings. The bottom-third of districts by NTL—the economically worst-affected districts—witnessed a higher share of gold in household savings of about 2.8 percentage points compared to other districts.

### *4.3. Panel estimation results*

Next, we re-estimate the baseline equation for a panel of households. As explained in the methodology section, estimations with panel data would account for time-invariant household-level heterogeneity, which otherwise is infeasible in a cross-sectional setting. The panel includes households that are included in the survey conducted in the 2015-16 financial year and the survey conducted during the COVID-19 period (2020-21). We limit the estimation to the common households in both surveys.

The results of the panel estimation are shown in Table 5. In columns (1)-(3), we show the results without household fixed effects so that the CVD indicator can be in-

[6]For instance, Beyer et al. (2018) find a high correlation of about 90 percent between NTL intensity and economic performance (GDP) at the district level in India.

cluded among the explanatory variables. This specification also controls for state fixed effects. The coefficient of the interaction term ($COVID\text{-}19 \times CVD$) is consistent with the baseline findings. We observe that the allocation of household savings to gold has increased significantly—by 3.8 percentage points—in the COVID-19 period in the vulnerable districts compared to the households in the less vulnerable districts. Furthermore, the results shown in columns (4)-(6) control for both household and state fixed effects.[7] We find that the results are consistent for both the gold and financial asset allocation observed for the vulnerable districts. There is an increase of about 4.3 percentage points in the share of gold in households' savings portfolios for the vulnerable districts in the COVID-19 period compared to the less vulnerable districts.

The panel data estimations which compare the COVID-19 period with a normal period for CVD districts vis-a-vis other districts help us to establish a causal relationship between the vulnerability to the pandemic and gold savings by households. The estimations control for any other unobserved household-specific factors driving the increased allocation to gold observed for the larger sample in the earlier cross-sectional regressions. The panel estimations validate our findings from the cross-sectional analysis for the COVID-19 period. Overall, the findings support the hypothesis that higher vulnerability leads to higher allocation to gold savings in household portfolios during a crisis.

# 5. Heterogeneity analysis

In this section, we analyze the channels through which the impact of COVID-19 vulnerability affects household decisions on the portfolio of savings. Hence, we re-estimate Equation 1 with several moderators. The results of the analysis are shown in Table 6. In columns (1)-(3), we examine whether the impact of COVID-19 on gold savings is driven by rural or urban households. Interestingly, the interaction of vulnerability and the indicator for rural household is insignificant, which suggests that there is no statistical difference in the allocation of gold in household savings across urban and rural households

[7]The household fixed effects subsume the district-level CVD indicator, which drops out in these estimations.

surveyed in our study.

In columns (4)-(6), we show the results of the analysis with the number of hospital beds per 100,000 population across states. The number of hospital beds—which captures the status of health infrastructure prior to the pandemic—is obtained from the Reserve Bank of India (RBI) database. A higher number of hospital beds indicates better access to health infrastructure and, consequently, is expected to mitigate the vulnerability of households to COVID-19. The coefficient of the interaction between $CVD$ and $Hospitalbeds$ is negative and significant (-0.074, see column (4)). The results indicate that while households in the vulnerable districts allocated higher savings to gold, those in vulnerable districts with better access to healthcare allocated a comparatively lesser share of their savings to gold.

In columns (7)-(9), we analyze whether households with ex-ante lower allocation to gold savings allocate a greater share of their savings to gold in the face of uncertainty. The results of the analysis indicate that the households in districts with an ex-ante lower allocation to gold (based on a survey during 2015-16) have a higher propensity to save in gold during the COVID-19 period. This may be due to a lower base of gold holdings for households in such districts, whereas in districts with higher ex-ante gold holdings households' need to accumulate additional gold may be lesser.

In columns (10)-(12), we show the results of the estimations with financial access as a moderating variable. For instance, Ghosh and Nath (2023) show that access to banking favourably impacts the Indian households' saving behaviour. *Fin. access* is a variable that takes the value 1 if the household belongs to a district with higher financial access, denoted by above average (above 0.12) bank branches per 1,000 population in the 2019-20 financial year. The results indicate that the allocation of gold is lower in households with higher financial access. It suggests that in the presence of alternative financial instruments, households are less likely to resort in gold as a safe haven during the pandemic.

Finally, in columns (13)-(15), we examine the impact of a female household head on gold savings in vulnerable districts. We do not find significantly higher gold savings by

households with a female household head in vulnerable districts. While the overall household allocation to gold in vulnerable districts is higher, there is no statistical difference in the allocation for households with or without a female head.

Table 7 captures the heterogeneity in gold shares in the savings portfolio based on the average income of the household. We define a sub-sample with high income as those households with above average income (above 438,011 Indian rupees) in our sample. The remaining households are categorized as low-income households. The results show that the shift in allocation towards gold in CVD districts is higher for poorer households compared to richer households. This can be attributed to the fact that poorer households, being risk-averse, tend to invest more in safe assets such as gold. Lu, Guo, and Gan (2020) also find evidence that in countries such as the United States of America, China, and others, an increase in household income is associated with an increase in risky assets including financial assets.

# 6. Robustness

## *6.1. Alternative dependent variable*

In all the estimations detailed above, the dependent variable was the share of household savings in three asset categories. An increase in the share of a particular asset might be due to reallocation from other assets, or from a change in the overall portfolio size with no change in absolute allocation to a particular asset. Hence, instead of shares of three asset categories—gold, financial assets, and other assets—as dependent variables, we conduct robustness checks using amounts invested in each asset class. Table 8 shows a shift towards gold in amounts, along with decrease in financial assets and other assets, in the CVD districts compared to other districts. These findings, together with the baseline results, indicate that the shift happened in both relative and absolute terms. This suggests that a higher asset allocation to safer assets occurred due to the COVID-19 crisis and not due to resizing of portfolios.

### *6.2. Alternative definition of vulnerability*

We further re-estimate our baseline equation with an alternative definition of COVID-19 vulnerability. In this analysis, we verify that our main findings are robust to changes in threshold of the top-third districts recording the highest COVID-19 cases for identifying the CVD districts. The results of this robustness check are presented in Table 9. Columns (1)-(3) show the results where CVD represents the top quartile (25%) of districts with the highest COVID-19 cases. Columns (4)-(6) present the results for the top quintile (20%) of districts with the highest COVID-19 cases. In both cases, there is a significantly higher share of gold savings of 5.8 and 3.1 percentage points respectively in the CVD districts compared to other districts. The results corroborate the baseline findings and support the hypothesis on vulnerability affecting household attitudes towards saving in gold.

## 7. Conclusion

In this paper, we examine whether the disruptions caused by the pandemic alter the composition of household savings in various asset classes. We rely on an extensive household survey that was conducted during the COVID-19 period to analyze the portfolio allocation of households. The findings support the argument that there was a "flight-to-safety" towards gold for households in COVID-19 vulnerable Indian districts—the top tercile of districts based on the number of reported COVID-19 cases—during the pandemic. The shift was observed both in relative and absolute terms. The higher allocation to gold has been primarily from financial assets and other assets, which mainly includes cash. The baseline findings are robust to the use of alternative measures of vulnerability, such as night-time lights (an indicator of the economic impact) and a continuous variable for COVID-19 cases per 1,000 population. Estimations using panel data provide further evidence that the economic shock due to the COVID-19 pandemic resulted in households reallocating their portfolio to safe assets such as gold. We also find that the effect is not homogenous across districts – the higher allocation to gold in household savings differs across districts in terms of prior access to health infrastructure, financial access, and their

past gold holdings.

Prior research on the safe haven role of gold during times of uncertainty has typically relied on macro data at the country level or across emerging markets and developed economies, or used small-scale surveys that are not generalizable. The findings of this study, based on representative surveys conducted during a normal period and the COVID-19 pandemic, suggest that there are important effects related to gold accumulation at the household level during heightened uncertainty. There is a need for further research at the household level, for instance, to better understand the links between gold and welfare consequences of the reliance of households on this asset. The behavior of households can provide guidance for policymakers to target interventions in areas with a higher incidence of gold savings.

The COVID-19 crisis has illustrated the critical importance of health infrastructure during global or nationwide health shocks. Our findings suggest that addressing geographical inequalities in the availability of health facilities would assuage the panic among the public and result in a reduced flight to safe assets such as gold. Furthermore, the findings suggest that better access to financial instruments and institutions can reduce the preference to hoard gold during times of crisis. A higher incidence of gold savings during uncertain times can have macroeconomic implications such as a widening current account deficit due to the reliance on gold imports to cater to increased demand. Our findings can help policymakers to address external vulnerabilities, especially during market turmoil and aggregate shocks.

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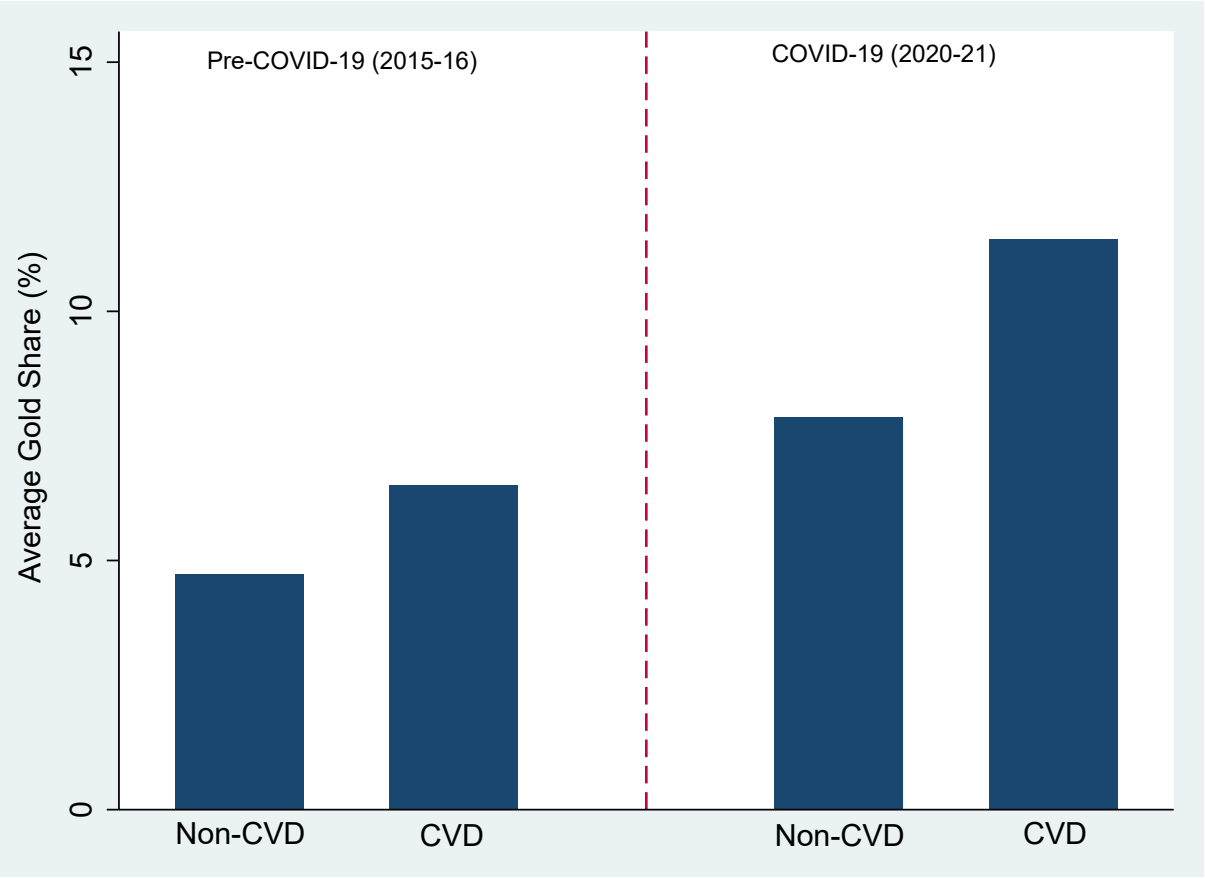
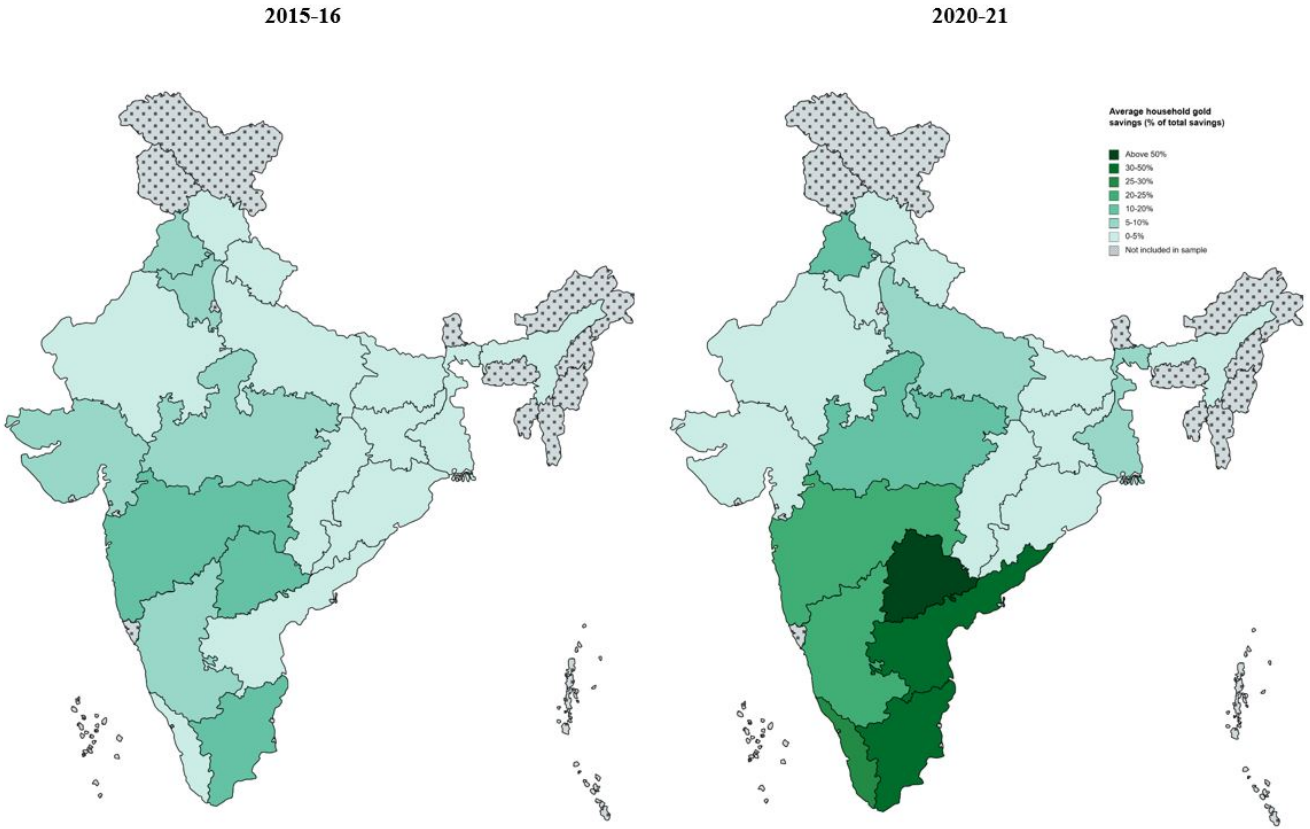
Figure 1: **Gold shares in the pre-COVID and COVID-19 periods**



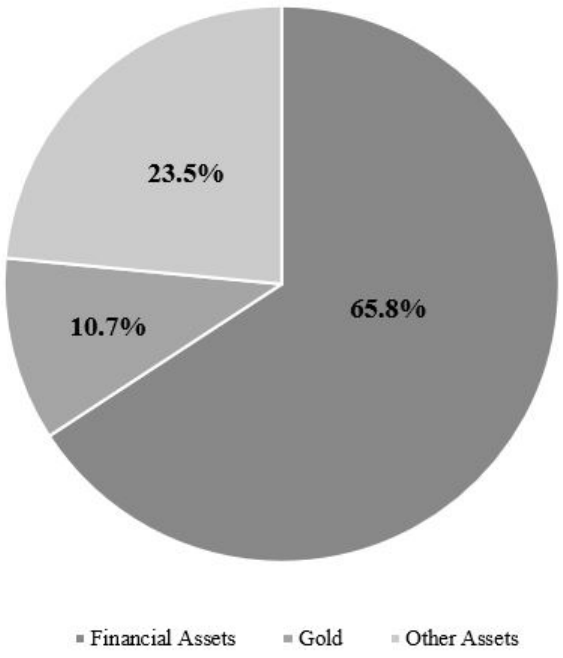

The figure shows the widening gap between average gold share in household savings portfolios in COVID-19 vulnerable districts (CVD) and other districts (non-CVD) for the pre-COVID and the COVID periods.

Figure 2: **Gold shares in the pre-COVID and COVID-19 periods for Indian states**



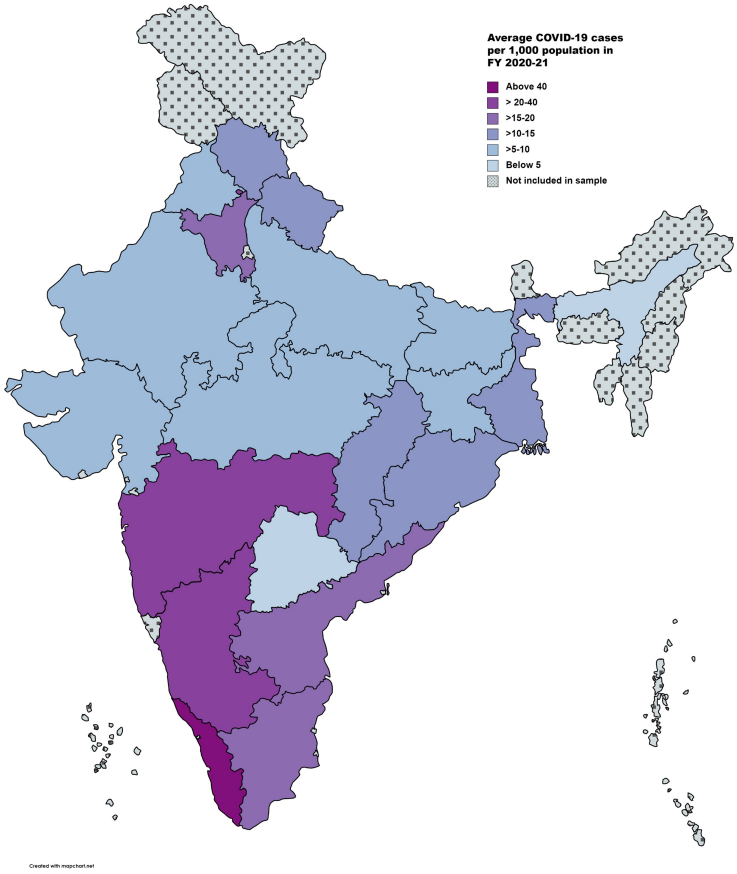

The figure shows the average share of gold savings in household portfolios aggregated at the state-level based on the surveys conducted in the 2015-16 and 2020-21 financial years.

Figure 3: **Household savings portfolio**




The figure shows the allocation of savings across three broad asset categories in household portfolios in 2020-21.

Figure 4: **Average COVID-19 cases per 1,000 population**




The figure shows the average COVID-19 cases per 1,000 population in the 2020-21 financial year for the states in the estimation sample.

Table 1: Variable definitions and data sources

| Variable | Definition and construction | Data source |
|---|---|---|
| *CVD* | The binary variable takes value 1 for top third vulnerable districts recording highest COVID-19 cases per 1,000 population, and 0 otherwise. | Authors' calculations based on Development Data Lab: SHRUG Database. |
| *Dist. COVID-19 cases per 1,000 population* | The variable represents the average COVID-19 cases per 1,000 population at the district level recorded in the year 2020-21 as described in the text. | Authors' calculations based on Development Data Lab: SHRUG Database. |
| *NTL_Low* | The binary variable takes value 1 for the bottom third districts recording lowest night-time lights intensity (equivalent to top third of the economically adversely affected districts during COVID-19), and 0 otherwise. | Authors' calculations based on district-level Night Time Lights (NTL) data compiled by Robert Beyer and Daynan Crull. |
| *Gold share* | The variable measures the share of gold savings, in both physical and digital forms, as a percentage of total household savings. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Fin.assets share* | The variable measures the share of financial assets as a percentage of total household savings. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Others share* | The variable measures the share of savings in miscellaneous assets like cash, real estate and precious metals and stones, as a percentage of total household savings. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Gold amount* | The variable measures the amount saved in gold, in all both physical and digital forms. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Fin.assets amount* | The variable measures the amount saved in financial assets. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Others amount* | The variable measures the amount saved in other assets such as cash, real estate and precious metals and stones. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Log (Household income)* | The variable measures the natural logarithm of total income of the household measured in rupees. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Female Members* | The variable captures the total number of female members in the household. | IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Household size* | The variable captures the total number of members in the household including male, female and children. | IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Rural* | The dummy variable takes a value 1 if the household belongs to a rural region, and 0 otherwise. | IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Age of household head* | The variable captures the age of the household head i.e., the chief wage earner (CWE). | IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Male household head* | The dummy variable takes a value 1 if the household head (CWE) is male, and 0 otherwise. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Married household head* | The dummy variable takes a value 1 if the household head (CWE) is married, and 0 otherwise. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |

*Continued on next page*

Table 1 – *Continued from previous page*

| Variables | Definition and Construction | Data Source |
|---|---|---|
| *College educated household head* | The dummy variable takes a value 1 if the household head (CWE) is college educated, and 0 otherwise. | Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021. |
| *Log (District GVA per capita)* | The variable measures the natural logarithm of per capita annual Gross Value Added (GVA) (in constant prices) in 2019-2020 at district level. | Authors' calculations based on Indicus Analytics: District GDP of India database. |
| *District GVA growth* | The variable measures Gross Value Added (GVA) per capita growth rate (annual %, in constant prices) in 2019-2020 at district level. | Authors' calculations based on Indicus Analytics: District GDP of India database. |
| *Agri. share in district GVA* | The variable captures the percentage share of agricultural sector in per capita annual Gross Value Added (GVA) (in constant prices) in 2019-2020 at district level. | Authors' calculations based on Indicus Analytics: District GDP of India database. |
| *Manuf. share in district GVA* | The variable captures the percentage share of manufacturing sector in per capita annual Gross Value Added (GVA) (in constant prices) in 2019-2020 at district level. | Authors' calculations based on Indicus Analytics: District GDP of India database. |
| *Services share in district GVA* | The variable captures the percentage share of services sector in per capita annual Gross Value Added (GVA) (in constant prices) in 2019-2020 at district level. | Authors' calculations based on Indicus Analytics: District GDP of India database. |
| *Low gold* | The binary variable takes value 1 for districts with below average gold holdings per 1,000 population in 2015-2016, and 0 otherwise. | Authors' calculations based on PRICE Household Survey 2015-2016. |
| *Fin. access* | The binary variable takes value 1 for districts with higher financial access, i.e., above average number of bank branches per 1,000 population in 2019-2020, and 0 otherwise. | Authors' calculations using Reserve Bank of India (RBI) dataset. |
| *Hospital beds* | The variable captures the number of hospital beds per 100,000 population across states in 2019-2020. | Authors' calculations using Reserve Bank of India (RBI) dataset. |

Table 2: Summary statistics

| Variable | No. of Observations | Mean | Std. Dev. | Minimum | p10 | p50 | p90 | Maximum |
|---|---|---|---|---|---|---|---|---|
| CVD | 21,611 | 0.266 | 0.442 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| Dist. COVID-19 cases per 1,000 population | 21,611 | 11.772 | 11.003 | 0.000 | 1.562 | 9.239 | 22.79 | 45.768 |
| NTL_Low | 21,611 | 0.311 | 0.463 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| Gold share | 21,611 | 10.743 | 27.592 | 0.000 | 0.000 | 0.000 | 49.296 | 100.000 |
| Fin. assets share | 21,611 | 65.758 | 35.756 | 0.000 | 0.000 | 81.081 | 100.000 | 100.000 |
| Others share | 21,611 | 23.500 | 30.450 | 0.000 | 0.000 | 9.091 | 80.952 | 100.000 |
| Gold amount | 21,611 | 7702.189 | 28196.796 | 0.000 | 0.000 | 0.000 | 35000.000 | 500000.000 |
| Fin. assets amount | 21,611 | 74156.494 | 131721.412 | 0.000 | 0.000 | 23500.000 | 225000.000 | 1925000.000 |
| Others amount | 21,611 | 13734.695 | 40209.890 | 0.000 | 0.000 | 3500.000 | 35000.000 | 1000000.000 |
| Log (Household income) | 21,611 | 12.99 | 0.948 | 10.404 | 11.695 | 13.108 | 14.127 | 14.957 |
| Female Members | 21,611 | 2.432 | 1.411 | 0.000 | 1.000 | 2.000 | 4.000 | 7.000 |
| Household size | 21,611 | 4.357 | 1.503 | 1.000 | 2.000 | 4.000 | 7.000 | 7.000 |
| Rural | 21,611 | 0.380 | 0.485 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| Age of household head | 21,611 | 43.299 | 12.000 | 21.000 | 28.000 | 42.000 | 60.000 | 71.000 |
| Male household head | 21,611 | 0.831 | 0.375 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| Married household head | 21,611 | 0.894 | 0.308 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| College educated household head | 21,611 | 0.137 | 0.344 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| Log (District GVA per capita) | 21,611 | 11.672 | 0.634 | 10.239 | 10.899 | 11.642 | 12.427 | 13.174 |
| District GVA growth | 21,611 | 9.440 | 0.067 | 9.223 | 9.353 | 9.443 | 9.520 | 9.595 |
| Agri. share in district GVA | 21,611 | 8.614 | 8.531 | 0.003 | 0.849 | 5.746 | 20.855 | 36.674 |
| Manuf. share in district GVA | 21,611 | 18.726 | 12.147 | 3.554 | 6.011 | 15.759 | 35.899 | 52.198 |
| Services share in district GVA | 21,611 | 51.615 | 13.305 | 25.315 | 32.701 | 51.709 | 67.462 | 80.824 |
| Low gold | 21,611 | 0.552 | 0.497 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| Fin. access | 21,611 | 0.489 | 0.500 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| Hospital beds | 18,594 | 57.877 | 48.492 | 12.941 | 26.821 | 44.638 | 106.716 | 324.393 |

Notes: The definition of the variables are provided in Table 1. $p$ represents percentile. *Std.Dev.* denotes the standard deviation.

Table 3: Gold and other asset shares in household portfolios during COVID-19

| | Gold share (1) | Fin. assets share (2) | Others share (3) |
|---|---|---|---|
| CVD | 6.902*** | -4.154*** | -2.747** |
| | (1.103) | (1.484) | (1.205) |
| Household-level controls | | | |
| Log (Household income) | -1.534*** | 5.172*** | -3.638*** |
| | (0.342) | (0.495) | (0.456) |
| Female members | 2.187*** | -3.499*** | 1.312*** |
| | (0.279) | (0.402) | (0.332) |
| Household size | -1.464*** | 3.136*** | -1.673*** |
| | (0.273) | (0.352) | (0.315) |
| Rural | -0.057 | -0.083 | 0.140 |
| | (0.714) | (1.183) | (1.060) |
| Age of household head | -0.016 | -0.036 | 0.052** |
| | (0.019) | (0.026) | (0.022) |
| Male household head | 0.587 | -0.726 | 0.139 |
| | (0.720) | (0.946) | (0.763) |
| Married household head | -0.838 | 1.729* | -0.891 |
| | (0.794) | (0.913) | (0.753) |
| College educated household head | 1.875** | 3.828*** | -5.703*** |
| | (0.774) | (0.879) | (0.651) |
| District-level controls | | | |
| Log (District GVA per capita) | 4.758*** | -5.696*** | 0.937 |
| | (0.983) | (1.289) | (1.136) |
| District GVA growth | 4.468 | -8.890 | 4.423 |
| | (6.114) | (8.448) | (7.102) |
| Agri. share in district GVA | -0.120* | 0.210* | -0.090 |
| | (0.068) | (0.107) | (0.088) |
| Manuf. share in district GVA | -0.414*** | 0.364*** | 0.050 |
| | (0.064) | (0.090) | (0.072) |
| Services share in district GVA | -0.099** | 0.158** | -0.059 |
| | (0.048) | (0.077) | (0.066) |
| Constant | -53.240 | 128.311 | 24.929 |
| | (60.833) | (83.047) | (70.911) |
| No. of observations | 21,611 | 21,611 | 21,611 |
| No. of districts | 142 | 142 | 142 |
| Adjusted R-squared | 0.038 | 0.036 | 0.025 |

Notes: CVD is an indicator for the top-third COVID-19 vulnerable districts (with highest COVID-19 cases per 1,000 population) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.

Table 4: Gold and other asset shares in household portfolios during COVID-19: Alternative vulnerability indicators

| | Gold share (1) | Fin. assets share (2) | Others share (3) | Gold share (4) | Fin. assets share (5) | Others share (6) |
|---|---|---|---|---|---|---|
| Dist. COVID-19 cases per 1,000 population | 0.124** | 0.008 | -0.133** | | | |
| | (0.053) | (0.068) | (0.052) | | | |
| NTL_Low | | | | 2.896*** | -0.005 | -2.892** |
| | | | | (0.949) | (1.402) | (1.159) |
| Household-level controls | | | | | | |
| Log(Household income) | -1.764*** | 5.304*** | -3.540*** | -1.838*** | 5.303*** | -3.465*** |
| | (0.333) | (0.487) | (0.447) | (0.335) | (0.486) | (0.446) |
| Female members | 2.435*** | -3.736*** | 1.301*** | 2.489*** | -3.727*** | 1.238*** |
| | (0.281) | (0.406) | (0.335) | (0.282) | (0.408) | (0.328) |
| Household size | -1.462*** | 3.134*** | -1.672*** | -1.411*** | 3.134*** | -1.723*** |
| | (0.274) | (0.356) | (0.313) | (0.271) | (0.357) | (0.313) |
| Rural | -0.009 | -0.044 | 0.053 | -0.773 | -0.049 | 0.822 |
| | (0.747) | (1.202) | (1.053) | (0.817) | (1.275) | (1.097) |
| Age of household head | -0.017 | -0.035 | 0.052** | -0.015 | -0.035 | 0.050** |
| | (0.019) | (0.026) | (0.022) | (0.019) | (0.026) | (0.022) |
| Male household head | 0.559 | -0.737 | 0.178 | 0.714 | -0.734 | 0.020 |
| | (0.729) | (0.961) | (0.761) | (0.746) | (0.954) | (0.759) |
| Married household head | -1.051 | 1.976** | -0.925 | -1.258 | 1.964** | -0.706 |
| | (0.794) | (0.924) | (0.757) | (0.792) | (0.927) | (0.764) |
| College educated household head | 1.927** | 3.783*** | -5.710*** | 2.005** | 3.785*** | -5.790*** |
| | (0.779) | (0.881) | (0.655) | (0.777) | (0.881) | (0.653) |
| District-level controls | | | | | | |
| Log (District GVA per capita) | 5.935*** | -7.233*** | 1.298 | 7.438*** | -7.138*** | -0.300 |
| | (1.093) | (1.406) | (1.195) | (0.924) | (1.131) | (1.012) |
| District GVA growth | 3.301 | -8.392 | 5.091 | 2.892 | -8.354 | 5.461 |
| | (6.146) | (8.399) | (7.039) | (6.184) | (8.406) | (7.093) |
| Agri. share in district GVA | -0.156** | 0.245** | -0.089 | -0.172** | 0.244** | -0.072 |
| | (0.069) | (0.108) | (0.088) | (0.068) | (0.108) | (0.088) |
| Manuf. share in district GVA | -0.438*** | 0.387*** | 0.050 | -0.404*** | 0.386*** | 0.018 |
| | (0.064) | (0.090) | (0.072) | (0.065) | (0.094) | (0.079) |
| Services share in district GVA | -0.091* | 0.137* | -0.045 | -0.029 | 0.138* | -0.109 |
| | (0.048) | (0.079) | (0.067) | (0.050) | (0.081) | (0.068) |
| Constant | -52.575 | 139.270* | 13.304 | -68.546 | 137.873* | 30.673 |
| | (61.173) | (82.092) | (70.844) | (61.512) | (82.189) | (71.220) |
| No. of observations | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 |
| No. of districts | 142 | 142 | 142 | 142 | 142 | 142 |
| Adjusted R-squared | 0.032 | 0.034 | 0.025 | 0.032 | 0.034 | 0.025 |

Notes: District-level COVID-19 cases per 1,000 population and NTL_Low are two alternative indicators for COVID-19 induced vulnerability. NTL_Low is the indicator for bottom-third districts recording lowest average night-time lights in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) and (4)-(6) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.

Table 5: Gold and other asset shares in household portfolios during COVID-19: Panel estimations

| | Gold share (1) | Fin. assets share (2) | Others share (3) | Gold share (4) | Fin. assets share (5) | Others share (6) |
|---|---|---|---|---|---|---|
| COVID19 | 4.293*** | -22.586*** | 18.292*** | 7.304*** | -25.454*** | 18.150*** |
| | (0.954) | (1.426) | (1.196) | (1.397) | (2.150) | (2.124) |
| CVD | -1.298 | -2.756* | 4.053*** | | | |
| | (1.110) | (1.640) | (1.395) | | | |
| COVID19 × CVD | 3.813** | -5.598** | 1.785 | 4.282** | -7.749*** | 3.467 |
| | (1.675) | (2.541) | (2.561) | (2.165) | (2.977) | (2.965) |
| Log(Household income) | 0.125 | 2.016*** | -2.141*** | -0.375 | 1.414 | -1.039 |
| | (0.493) | (0.758) | (0.701) | (0.758) | (1.222) | (1.083) |
| Household size | 0.281** | -0.115 | -0.166 | 0.540* | 0.212 | -0.752* |
| | (0.141) | (0.219) | (0.203) | (0.278) | (0.445) | (0.399) |
| Log(District GVA per capita) | -0.000* | 0.000 | 0.000 | -0.000*** | 0.000** | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| District GVA growth | -0.208** | 0.748*** | -0.540*** | -0.627*** | 0.818** | -0.191 |
| | (0.096) | (0.185) | (0.169) | (0.194) | (0.346) | (0.344) |
| Agri. share in district GVA | 0.037 | -0.042 | 0.006 | -1.598** | 5.496*** | -3.898*** |
| | (0.069) | (0.121) | (0.115) | (0.802) | (1.017) | (0.960) |
| Manuf. share in district GVA | 0.054 | 0.061 | -0.115 | -0.906 | 2.607 | -1.701 |
| | (0.067) | (0.116) | (0.118) | (1.203) | (1.753) | (1.528) |
| Services share in district GVA | 0.035 | -0.041 | 0.007 | -0.255 | 2.822*** | -2.567*** |
| | (0.057) | (0.101) | (0.097) | (0.491) | (0.815) | (0.769) |
| Constant | 2.427 | 52.471*** | 45.102*** | 66.053 | -193.820*** | 227.767*** |
| | (7.383) | (11.640) | (10.473) | (42.867) | (70.471) | (62.559) |
| No. of observations | 6,753 | 6,753 | 6,753 | 5,294 | 5,294 | 5,294 |
| Adjusted R-Squared | 0.049 | 0.124 | 0.102 | 0.029 | 0.11 | 0.079 |
| Household fixed effects | No | No | No | Yes | Yes | Yes |
| State fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |

Notes: CVD is an indicator for the top-third COVID-19 vulnerable districts (with highest COVID-19 cases per 1,000 population) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) and (4)-(6) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.

Table 6: Gold and other asset shares in household portfolios during COVID-19: Heterogeneity test

| | Rural households | | | Hospital beds | | | Low gold share | | | Financial access | | | Female head | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
| Rural | 0.299 | 0.700 | -0.999 | | | | | | | | | | | | |
| | (0.796) | (1.090) | (1.021) | | | | | | | | | | | | |
| CVD × Rural | -1.586 | -3.482 | 5.068 | | | | | | | | | | | | |
| | (1.987) | (3.374) | (3.255) | | | | | | | | | | | | |
| Hospital beds | | | | 0.053** | -0.162*** | 0.109*** | | | | | | | | | |
| | | | | (0.023) | (0.037) | (0.024) | | | | | | | | | |
| CVD × Hospital beds | | | | -0.074*** | 0.138*** | -0.064** | | | | | | | | | |
| | | | | (0.025) | (0.040) | (0.028) | | | | | | | | | |
| Low gold | | | | | | | -4.850*** | 3.903** | 0.947 | | | | | | |
| | | | | | | | (0.855) | (1.511) | (1.305) | | | | | | |
| CVD × Low gold | | | | | | | 6.414*** | -1.090 | -5.324** | | | | | | |
| | | | | | | | (1.826) | (2.458) | (2.108) | | | | | | |
| Fin. access | | | | | | | | | | -0.700 | 5.659*** | -4.960*** | | | |
| | | | | | | | | | | (1.037) | (1.383) | (1.314) | | | |
| CVD × Fin. access | | | | | | | | | | -5.846** | 5.119* | 0.727 | | | |
| | | | | | | | | | | (2.532) | (3.073) | (2.589) | | | |
| Fem_HH | | | | | | | | | | | | | -0.847 | -1.062 | 1.909 |
| | | | | | | | | | | | | | (1.061) | (1.803) | (1.543) |
| CVD × Fem_HH | | | | | | | | | | | | | 0.130 | -1.797 | 1.667 |
| | | | | | | | | | | | | | (1.909) | (2.289) | (2.059) |
| CVD | 7.323*** | -3.269** | -4.054*** | 10.491*** | -12.673*** | 2.182 | 3.868*** | -3.739** | -0.129 | 10.782*** | -7.336** | -3.446 | 6.881*** | -4.004*** | -2.876** |
| | (1.243) | (1.642) | (1.213) | (1.850) | (2.733) | (2.149) | (1.455) | (1.836) | (1.553) | (2.412) | (2.898) | (2.454) | (1.138) | (1.507) | (1.239) |
| No. of observations | 21,611 | 21,611 | 21,611 | 18,594 | 18,594 | 18,594 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 |
| Household-level controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| District-level controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.034 | 0.033 | 0.026 | 0.041 | 0.044 | 0.032 | 0.042 | 0.036 | 0.026 | 0.036 | 0.035 | 0.027 | 0.034 | 0.033 | 0.025 |

Notes: CVD is an indicator for the top-third COVID-19 vulnerable districts (with highest COVID-19 cases per 1,000 population) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3), (4)-(6), (7)-(9), (10)-(12) and (13)-(15) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.

Table 7: Gold and other asset shares in household portfolios during COVID-19: Heterogeneity test based on household income

| | High Income Subsample | | | Low Income Subsample | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| CVD | 5.467*** | -1.800 | -3.667*** | 7.339*** | -5.185*** | -2.154 |
| | (1.525) | (1.889) | (1.336) | (1.305) | (1.679) | (1.568) |
| Household-level controls | | | | | | |
| Log (Household income) | -0.440 | -0.312 | 0.753 | -2.196*** | 6.699*** | -4.503*** |
| | (0.927) | (1.248) | (1.184) | (0.490) | (0.737) | (0.673) |
| Female members | 2.796*** | -4.779*** | 1.983*** | 1.634*** | -2.493*** | 0.859** |
| | (0.443) | (0.586) | (0.437) | (0.331) | (0.488) | (0.424) |
| Household size | -1.815*** | 4.123*** | -2.308*** | -1.048*** | 2.325*** | -1.277*** |
| | (0.413) | (0.525) | (0.459) | (0.328) | (0.436) | (0.402) |
| Rural | -0.055* | 0.030 | 0.025 | -0.004 | -0.048 | 0.052** |
| | (0.029) | (0.041) | (0.033) | (0.023) | (0.031) | (0.026) |
| Age of household head | 2.489*** | -2.250* | -0.239 | -0.973 | 0.807 | 0.166 |
| | (0.935) | (1.349) | (1.013) | (0.893) | (1.102) | (0.981) |
| Male household head | -1.571 | 1.868 | -0.297 | -0.063 | 1.232 | -1.169 |
| | (1.154) | (1.615) | (1.229) | (0.965) | (1.077) | (0.961) |
| Married household head | 2.327** | 3.076** | -5.403*** | 0.627 | 6.406*** | -7.033*** |
| | (1.074) | (1.194) | (0.831) | (0.958) | (1.155) | (0.953) |
| College educated household head | -1.766** | -0.205 | 1.971 | 1.318 | -0.982 | -0.337 |
| | (0.835) | (1.545) | (1.321) | (0.898) | (1.386) | (1.378) |
| District-level controls | | | | | | |
| Log (District GVA per capita) | 1.407 | 0.605 | -2.012 | 6.564*** | -8.701*** | 2.137 |
| | (1.422) | (1.996) | (1.805) | (1.081) | (1.485) | (1.343) |
| District GVA growth | -1.862 | -19.778* | 21.640*** | 7.680 | 0.476 | -8.156 |
| | (8.130) | (11.276) | (8.352) | (7.045) | (9.676) | (9.192) |
| Agri. share in district GVA | 0.025 | -0.148 | 0.123 | -0.210** | 0.408*** | -0.198* |
| | (0.089) | (0.140) | (0.113) | (0.082) | (0.121) | (0.101) |
| Manuf. share in district GVA | -0.166* | -0.110 | 0.276*** | -0.563*** | 0.607*** | -0.045 |
| | (0.086) | (0.122) | (0.105) | (0.077) | (0.111) | (0.085) |
| Services share in district GVA | 0.135** | -0.228** | 0.093 | -0.212*** | 0.332*** | -0.120 |
| | (0.068) | (0.107) | (0.088) | (0.058) | (0.087) | (0.074) |
| Constant | 14.658 | 261.372** | -176.030** | -87.896 | 41.746 | 146.150 |
| | (82.377) | (111.543) | (83.172) | (69.482) | (96.507) | (91.627) |
| No. of observations | 7,949 | 7,949 | 7,949 | 13,662 | 13,662 | 13,662 |
| Adjusted R-squared | 0.049 | 0.021 | 0.026 | 0.039 | 0.042 | 0.018 |

Notes: CVD is an indicator for the top-third COVID-19 vulnerable districts (with highest COVID-19 cases per 1,000 population) in the 2020-21 financial year. Higher income subsample refers to households with above average household income (above 438,011 Indian rupees).The dependent variables shown in columns (1)-(3) and (4)-(6) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.

Table 8: Gold and other asset shares in household portfolios during COVID-19: Amount saved

| | Gold amount (1) | Fin. assets amount (2) | Others amount (3) |
|---|---|---|---|
| CVD | 3897.623*** | -11465.948** | -3478.203*** |
| | (726.880) | (5644.802) | (1212.650) |
| Household-level controls | | | |
| Log (Household income) | 1450.945*** | 43607.066*** | 6566.624*** |
| | (319.632) | (2898.062) | (609.473) |
| Female members | 518.040* | -9545.245*** | -37.251 |
| | (267.458) | (1413.767) | (383.361) |
| Household size | -20.427 | 3210.217** | -903.532** |
| | (252.195) | (1316.977) | (391.975) |
| Rural | -328.971 | -10313.251** | -1490.009 |
| | (575.289) | (4802.148) | (1330.878) |
| Age of household head | 42.913*** | 328.131*** | 106.335*** |
| | (16.466) | (99.677) | (25.504) |
| Male household head | -99.329 | -7876.443 | 9.183 |
| | (632.420) | (5069.680) | (1099.332) |
| Married household head | 205.197 | 2230.136 | -228.417 |
| | (683.728) | (4372.704) | (1159.916) |
| College educated household head | 5375.190*** | 55141.768*** | 3404.384** |
| | (938.524) | (6511.339) | (1328.910) |
| District-level controls | | | |
| Log (District GVA per capita) | 1392.339* | -5531.099 | -2439.383* |
| | (751.200) | (5173.623) | (1371.480) |
| District GVA growth | -4782.319 | -79928.883** | 3191.352 |
| | (4561.120) | (33117.539) | (7573.390) |
| Agri. share in district GVA | -121.079** | -84.749 | -7.930 |
| | (55.350) | (416.393) | (88.244) |
| Manuf. share in district GVA | -266.821*** | -694.641** | -134.566* |
| | (56.585) | (331.505) | (79.296) |
| Services share in district GVA | -57.250 | 280.057 | 93.833 |
| | (43.546) | (277.865) | (68.134) |
| Constant | 21965.242 | 325082.795 | -74831.780 |
| | (43821.519) | (334662.168) | (78253.976) |
| No. of observations | 21,611 | 21,611 | 21,611 |
| No. of districts | 142 | 142 | 142 |
| Adjusted R-squared | 0.020 | 0.143 | 0.033 |

Notes: CVD is an indicator for the top-third COVID-19 vulnerable districts (with highest COVID-19 cases per 1,000 population) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.

Table 9: Gold and other asset shares in household portfolios during COVID-19: Robustness with alternative definition of vulnerability

| | Top Quartile (25%) | | | Top Quintile (20%) | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| CVD | 5.792*** | -3.249* | -2.543* | 3.084* | 0.447 | -3.532** |
| | (1.391) | (1.798) | (1.496) | (1.619) | (2.101) | (1.555) |
| Household-level controls | | | | | | |
| Log (Household income) | -1.739*** | 5.284*** | -3.545*** | -1.804*** | 5.299*** | -3.494*** |
| | (0.338) | (0.490) | (0.448) | (0.332) | (0.486) | (0.450) |
| Female members | 2.325*** | -3.596*** | 1.271*** | 2.492*** | -3.737*** | 1.245*** |
| | (0.278) | (0.400) | (0.329) | (0.284) | (0.413) | (0.339) |
| Household size | -1.441*** | 3.128*** | -1.687*** | -1.454*** | 3.134*** | -1.680*** |
| | (0.272) | (0.352) | (0.315) | (0.274) | (0.355) | (0.313) |
| Rural | -0.123 | -0.033 | 0.157 | -0.175 | -0.062 | 0.237 |
| | (0.742) | (1.193) | (1.057) | (0.761) | (1.213) | (1.050) |
| Age of household head | -0.014 | -0.037 | 0.051** | -0.016 | -0.035 | 0.051** |
| | (0.019) | (0.026) | (0.022) | (0.019) | (0.026) | (0.022) |
| Male household head | 0.452 | -0.646 | 0.194 | 0.633 | -0.730 | 0.098 |
| | (0.730) | (0.958) | (0.757) | (0.734) | (0.955) | (0.752) |
| Married household head | -0.981 | 1.820** | -0.840 | -1.130 | 1.979** | -0.849 |
| | (0.791) | (0.924) | (0.760) | (0.788) | (0.928) | (0.753) |
| College educated household head | 1.696** | 3.934*** | -5.630*** | 1.948** | 3.783*** | -5.731*** |
| | (0.779) | (0.881) | (0.658) | (0.779) | (0.882) | (0.657) |
| District-level controls | | | | | | |
| Log (District GVA per capita) | 5.471*** | -6.083*** | 0.612 | 6.556*** | -7.254*** | 0.698 |
| | (1.028) | (1.272) | (1.107) | (0.973) | (1.260) | (1.096) |
| District GVA growth | 5.350 | -9.201 | 3.851 | 4.151 | -8.311 | 4.159 |
| | (6.090) | (8.445) | (7.130) | (6.147) | (8.383) | (7.058) |
| Agri. share in district GVA | -0.152** | 0.228** | -0.076 | -0.166** | 0.246** | -0.080 |
| | (0.068) | (0.107) | (0.088) | (0.068) | (0.109) | (0.089) |
| Manuf. share in district GVA | -0.421*** | 0.365*** | 0.057 | -0.442*** | 0.388*** | 0.053 |
| | (0.064) | (0.090) | (0.072) | (0.064) | (0.091) | (0.073) |
| Services share in district GVA | -0.121** | 0.166** | -0.045 | -0.080* | 0.137* | -0.057 |
| | (0.048) | (0.078) | (0.066) | (0.048) | (0.078) | (0.065) |
| Constant | -65.090 | 133.301 | 31.789 | -66.786 | 138.820* | 27.966 |
| | (60.971) | (82.904) | (71.071) | (60.134) | (82.488) | (71.199) |
| No. of observations | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 | 21,611 |
| Adjusted R-squared | 0.034 | 0.035 | 0.024 | 0.032 | 0.034 | 0.025 |

Notes: CVD is an indicator for the top-fourth and top-fifth COVID-19 vulnerable districts (with highest COVID-19 cases per 1,000 population) in the 2020-21 financial year in columns (1)-(3) and (4)-(6), respectively. The dependent variables shown in columns (1)-(3) and (4)-(6) are the Gold share, Financial assets share, and Other assets share in the savings portfolio of households in percentage terms. The definition of the variables are provided in Table 1. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels, respectively. Heteroscedasticity consistent robust standard errors, given in parentheses, are clustered at the block (sub-district) level.