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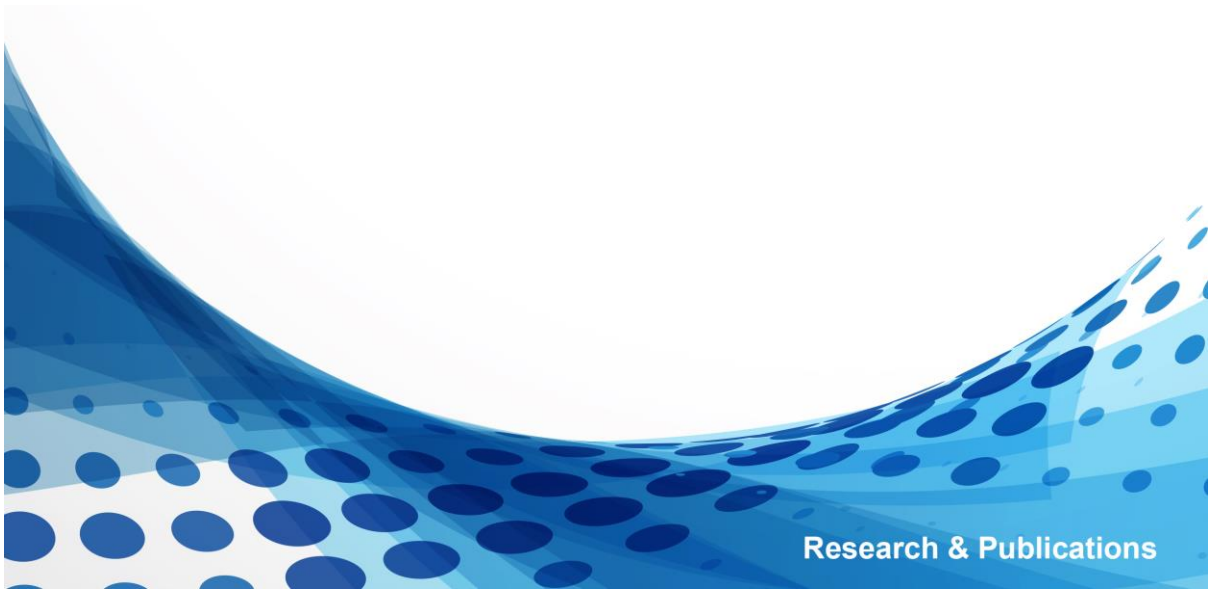

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Gold in household portfolios during a pandemic: Evidence from an emerging economy*

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 a nationally representative household survey conducted in 2020-2021 for 142 districts in India. We find that the portfolio allocation of households in districts with a higher incidence of COVID-19 shifted towards gold—a safe asset—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 largest adverse economic impact—captured 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 confirm 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 reallocation, household survey, COVID-19
JEL classification: D14; G11; G51

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1. Introduction

Gold is often considered 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 (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 such as 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). The disruptions to normal economic activities resulted in large income drops of approximately 35% for salaried workers, and 75% for daily wage earners (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. The economic shock and heightened uncertainty during the pandemic altered the consumption and savings behavior of households. For instance, the preference towards savings in equity investments diminished and the preference for relatively secure investment options increased (Gurbaxani & Gupte, 2021; Mushir & Suryavanshi, 2021).

Gold has traditionally been considered 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 in Indian households (Bhalotra, Chakravarty, & Gulesci, 2020; Menon, 2020; Mukherjee, Mukherjee, & Das, 2017). The consumption of gold in India

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 a nationally representative 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—was affected by the geographical variation in the intensity of the COVID-19 pandemic across Indian districts. The impact of the pandemic varied across the different districts in India depending on several factors, such as their prior health infrastructure 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 light 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 overlapping households from a representative survey conducted in the pre-COVID-19 period (2015-16) and the COVID-19 period survey 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, is tilted towards gold during the pandemic compared to households in other districts. The gold share in CVD districts is higher by 6.9 percentage points compared to 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 the normal period (2015-16) and the COVID-19 period (2020-21), we observe the wedge in the share of gold in household savings between the CVD and non-CVD districts rises substantially during the pandemic (see Figure 1). The results using panel data substantiate the cross-sectional regression and univariate findings. However, the effect observed is lower, which is about 3.8 percentage points increase in the share of gold in household savings, as the estimations control for unobserved heterogeneity at the household level. The economic significance of the impact

on reallocation to gold observed in our study for the households in vulnerable districts is between 36% and 64% relative to the average share of gold in household savings across various specifications.

Furthermore, it is likely that the measure of vulnerability based on COVID-19 cases used in our study 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 impact. The analysis using night-time lights intensity (NTL)—an indicator that captures the economic activity levels in a district (Beyer, Chhabra, Galdo, & Rama, 2018)—shows a similar 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 tend to have a higher allocation to gold, which is about 2.9 percentage points higher than the districts with higher economic activity.

Since 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, CVD districts with better access to health infrastructure have a relatively lower—albeit still positive in absolute terms—allocation to gold. Access to health infrastructure moderates the allocation choice to gold negatively as access to superior health facilities may reduce the need for precautionary savings in safe assets.

Moreover, CVD districts with lower prior gold holdings, which is defined as the share of gold holdings 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 times of uncertainty. Next, 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 allocation of households savings to gold among those in CVD districts is relatively lower for those

households with better access to financial institutions. Overall, our findings indicate that the choice of allocation, while higher for vulnerable districts, vary significantly based on other factors that affect the level of vulnerability faced by households during volatile times.

We conduct several robustness tests to validate our baseline findings. In addition to portfolio shares, we conduct estimations using amounts of each asset in household portfolios, as changes in the total savings can also lead to changes in the proportional savings in each component even without a commensurate change in the amount of savings in each component. To account for this possibility, we re-estimate our baseline with amounts as the dependent variable and find that the amount allocated to gold in household savings increases in the COVID-19 vulnerable districts compared to other districts. Our results establish that the portfolio shift occurs in both relative and absolute terms. Robustness checks have also been done using alternative definitions of vulnerability, where we have considered two alternative 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. The results for the estimations with alternative CVD indicators show an increase in the share of savings allocated to gold in CVD districts and are consistent with the baseline findings.

This paper makes a number of novel contributions to the literature. Several studies have shown that gold acts as a safe haven as well as a safe asset during times of distress using aggregate market-level data (Baur & McDermott, 2010; Ming et al., 2020; Salisu, Raheem, & Vo, 2021), however, this study demonstrates the role of gold in household portfolio allocation during uncertain times. Our study complements many other studies that have examined portfolio reallocation 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 a nationally representative survey conducted after the onset of COVID-19. In general, earlier studies that used surveys to

examine the impact of the pandemic on economic outcomes either are relatively small-scale with a small 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 allow 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 the 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 reallocation 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 (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 like age and wealth structure influence household portfolio 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 rebalance their portfolio slowly to be cost effective. Ghilarducci, Radpour, Fisher, Webb, et al. (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—allocating 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 true for all categories of assets. Financial assets 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 the Asian crisis on household behavior. 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 herd-like 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 effect from volatile stocks to relatively conservative long term government bonds in the Asia-pacific region during the financial crisis. As assets becomes more negatively correlated with volatility, the preference to re-balance portfolios towards more liquid securities simultaneously increases (Vayanos, 2004). However, Inci, Li, and McCarthy (2011) observe that when market risks become too high, flight-to-quality diminishes.

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

portfolio. 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 like 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) 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, in the major developed economies, but not in emerging markets. In developing economies and emerging markets, gold performed as a safe haven for domestic investors in particular (Gürgün & Ünalmış, 2014). Again, compared to economic contractions during 1980s and 1990s, aggressive allocation to gold has yielded better returns since the financial crisis of 2007 (Emmrich & McGroarty, 2013). Ming et

al. (2020) find that gold is a strong safe haven for domestic investors in China during negative stock market conditions and crashes. A pre- and post-COVID-19 period analyses confirm the ability of gold to serve as a safe haven instrument during the pandemic than other financial assets like US stocks as, and other precious metals like 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. Garg (2022) reports that though the demand of gold fell shortly during the COVID-19 pandemic, with the increase in gold prices, Indian investors returned to investing in gold ETFs. Mukherjee and Bardhan (2022) find that in the pre-COVID-19 period stock market returns affected the volatility of gold and crude oil prices. However, during the pandemic the relationship was reversed—volatility of gold and crude oil prices affected stock market returns. However, the role of gold during crisis has remained debatable. 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 give 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 the large-scale household survey conducted by an independent agency, the district-level data on the incidence of COVID-19, and the Indicus Analytics District GDP of India database for the controls at a 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 nationally representative survey (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 biannual survey was carried out in 2 waves across 40,427 households across 160 districts in 23 states. Based on data availability for variables used in the analysis, a sample of 21,611 households in 142 districts in 21 states has been used in the estimations. To compare the changes in household gold savings, we have also used a prior nationally 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 include 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.[1] 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). These are categorized based on various levels of liquidity, with cash being the most liquid and gold the least liquid.

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

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-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. COVID-19 cases per 1,000 have been calculated by dividing the average cumulative annual cases by the average population of the district in 2020. Figure 4 shows the average monthly 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.[2] 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]We have not shown the average COVID-19 cases for states not included in our sample, which is based on the surveyed districts across the country.

[3]Other sectors like mining and quarrying, fishing, forestry, construction, etc. contained in GVA has not been incorporated in our analysis.

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.

3.2.1. 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:

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

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 per capita COVID-19 cases, 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 growth of per capita Gross Value Added (GVA), the share of agriculture, industry, manufacturing, and services sector in district output.

3.2.2. Difference-in-differences estimation using panel data

In this section, we present the methodology for a difference-in-differences (DiD) estimation using a panel dataset which allows us to account for unobserved heterogeneity across households. The estimations also allow us to draw causal inference on the household allocation choices during a crisis period compared to normal period. We construct a two-year panel of common households surveyed in 2015-16 and 2020-21. We use the following DiD estimation on the panel data of 4,629 households:

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

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 per capita COVID-19 cases, and 0 for the bottom two-thirds of districts. Therefore, the households in the top one-third of districts with the highest number of per capita cases are the 'treatment' group and households in other districts are the 'control' group. β_1 captures the incremental allocation to gold and other assets during the COVID-19 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. γ_i and μ_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 with and without household fixed effects.

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 holdings in households located in COVID-vulnerable districts (see coefficient of CVD in column (1)) has significantly increased during the pandemic period. The reallocation of household savings towards gold in the COVID-vulnerable districts is 6.9 percentage points, which is about 70% of the mean share of gold holdings held by the average household in our sample. Therefore, the reallocation observed for the vulnerable districts is economically significant. Interestingly, the reallocation has been from other financial assets, in which we see a significant drop in holdings. We also find significant reallocation 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 shift in the increased allocation to gold holdings provides support to the argument that gold serves as a hedge during heightened uncertainty in crisis episodes. It is likely that the increased health risk and potential tail risk faced by the households encourage 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 is 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. Also, households with a higher number of female members, college-educated household

head and smaller sizes allocate more of the household income to gold holdings. While the education of the household heads, the size of the household, and household income positively affect the proportion of financial asset holdings, the 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 negative association between shares of agricultural, manufacturing, and services sectors in district GVA and gold savings implies that relatively developed districts have a lower share of gold in overall savings. By contrast, an increase in district GVA per capita [4] is accompanied by an increase in household gold holdings. This is plausibly due to regional variation, since both GVA per capita and average gold holding are higher for districts belonging to Southern states like Karnataka, Telangana, Kerala, etc.

The 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 the 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 the 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). NTL has been used in recent studies as a measure of economic activity, with a higher intensity of nighttime lights associated with greater economic activity in that particular area (Beyer et al., 2018, 2021).[5] In our study, the data is used to gauge

[4]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.

[5]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.

the impact of a differential impact of the pandemic-induced economic uncertainty on household savings portfolios across Indian districts.[6]

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 to March 2021. The results of the estimations are shown in Table 4. Columns (1)-(3) show the results with COVID-19 cases 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 households. 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 an increase in the share of gold in household saving by 2.8 percentage points.

4.3. Difference-in-differences 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 overlapping households in both surveys.

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

[6]The composite dataset by the name LEN (Light Every Night) can be obtained from World Bank website. The underlying data of LEN is sourced from the NOAA/NCEI archive. Visible and near-infrared (VNIR) emissions at night detected by satellites DMSP-OLS and the VIIRS-DNB have been used to compile the night-time lights data (Min et al., 2021).

planatory variables. This specification also controls for state fixed effects. The coefficient of the interaction term (*COVID-19* $\times$ *CVD*) is consistent with the baseline findings. We observe that the allocation of household saving to gold has increased significantly—by 3.8 percentage points—in the post-COVID period in the vulnerable districts compared to those households in the less vulnerable districts. Furthermore, the results shown in columns (4)-(6) control for both household and state fixed effects. 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 for the vulnerable districts in the post-COVID-19 period compared to the less vulnerable districts.

The difference-in-differences specification employed in the estimation helps us to establish a causal relationship between the vulnerability to the pandemic and gold savings by households, and validates the findings from the cross-sectional analysis for the COVID-19 period. 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. Overall, the findings validate the hypothesis that higher vulnerability leads to higher allocation to gold savings in household portfolios.

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 subsubsection 3.2.1 with several moderators. The results of the analysis are shown in Table 6. In columns (1)-(3), we examine whether the impact on gold savings is driven by rural households. Interestingly, the interaction of vulnerability and the rural household is insignificant, which suggests that there is no statistical difference in the allocation of gold in savings across both urban and rural households surveyed in our study.

In columns (4)-(6), we show the results of the analysis with the number of hospital beds per 1,00,000 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. The higher number of beds indicates access to health infrastructure and, consequently, is expected to mitigate the vulnerability of households to COVID-19. The results indicate that, while the vulnerable districts allocated higher savings to gold, those vulnerable districts with better access to healthcare allocated comparatively less to gold-based savings. The coefficient of the interaction between CVD and $Hospitalbeds$ is negative and significant (-0.074, see column (4)).

In columns (7)-(9), we analyze whether households with ex-ante lower allocation to gold savings allocate higher to gold-based savings 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.

In columns (10)-(12), we show the result of the estimations with financial access as a moderating variable. *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 instruments, households are less likely to resort in gold as a safe haven.

Finally, in columns (13)-(15), we examine the impact of a female household head on gold savings in vulnerable districts. We do not find any significant increase in gold savings in vulnerable households with a female household head. While the overall allocation in vulnerable households is high, there is no difference in the allocation for households with or without a female head.

Table 7 captures the heterogeneity in gold shares in the portfolio based on the average income of the household. We define 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 richer households hold a lesser proportion of gold compared to lower-income households. This can be

attributed to the fact that poorer households, being risk-averse, invest more in safe assets like gold. Lu, Guo, and Gan (2020) also find evidence that in countries like the United States of America, China, and others, an increase in household income is associated with an increase in risky assets like financial assets.

6. Robustness

6.1. Alternative dependent variable

In all the estimations detailed above, the dependent variable was the share of household saving in three asset categories. 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. An increase in shares of a particular asset might be caused due to reallocation from other assets, or a change in overall portfolio size with no change in absolute allocation to a particular asset. However, Table 8 shows a shift to gold in amounts, along with a decrease in financial and other assets. The findings, together with the baseline results, indicate that the shift happened in both relative and absolute terms. This suggests that the asset reallocation 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. This analysis has been primarily done to show that threshold of districts recording the highest COVID-19 cases in the financial year 2020-21 is trivial. 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 significant increase in gold holdings by 5.8 and 3.1 percentage points respectively. The results corroborate the baseline findings and support the hypothesis on vulnerability affecting household attitude 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 a nationally representative 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 reallocation has been primarily from financial assets and other assets which mainly include cash. 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 reallocation to gold differs across districts in terms of prior access to health infrastructure, financial access, and their prior 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 nationally 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 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 geograph-

ical 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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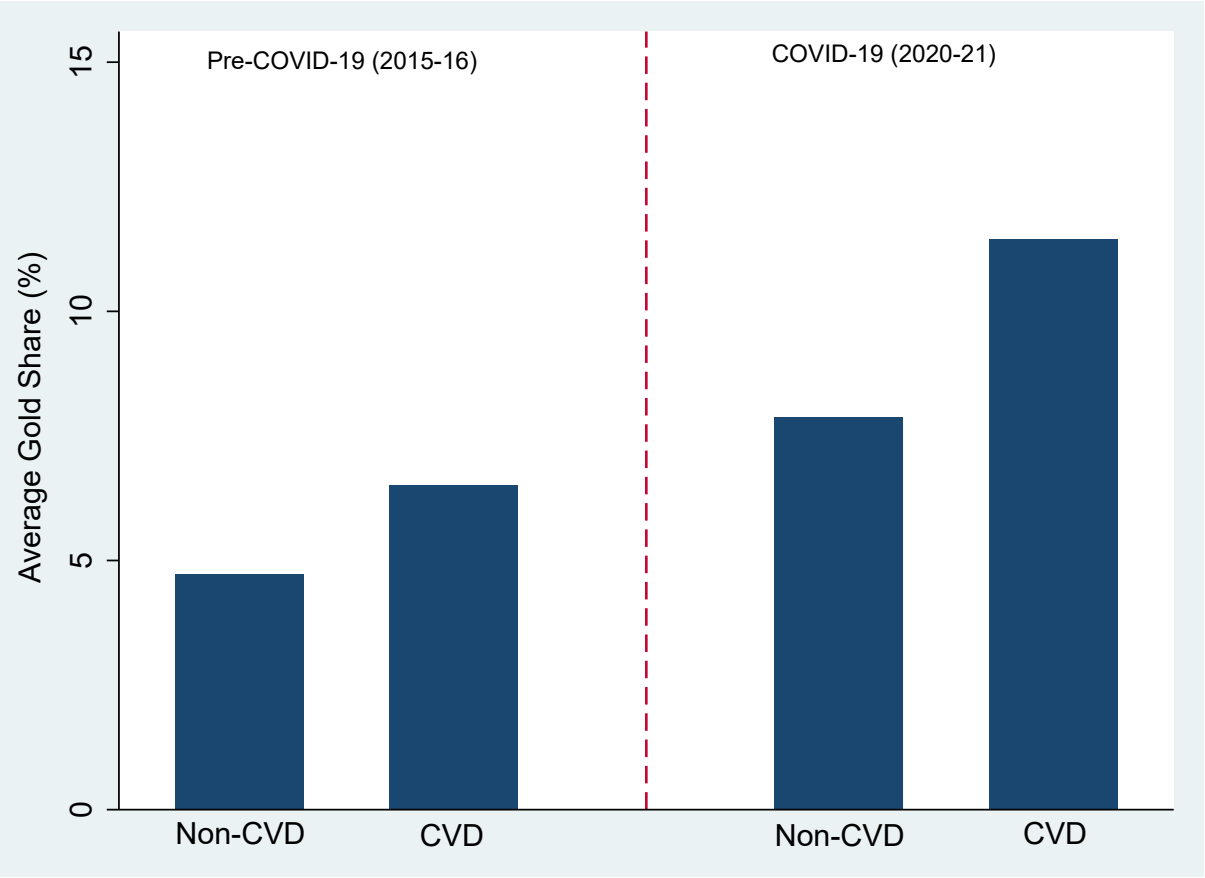
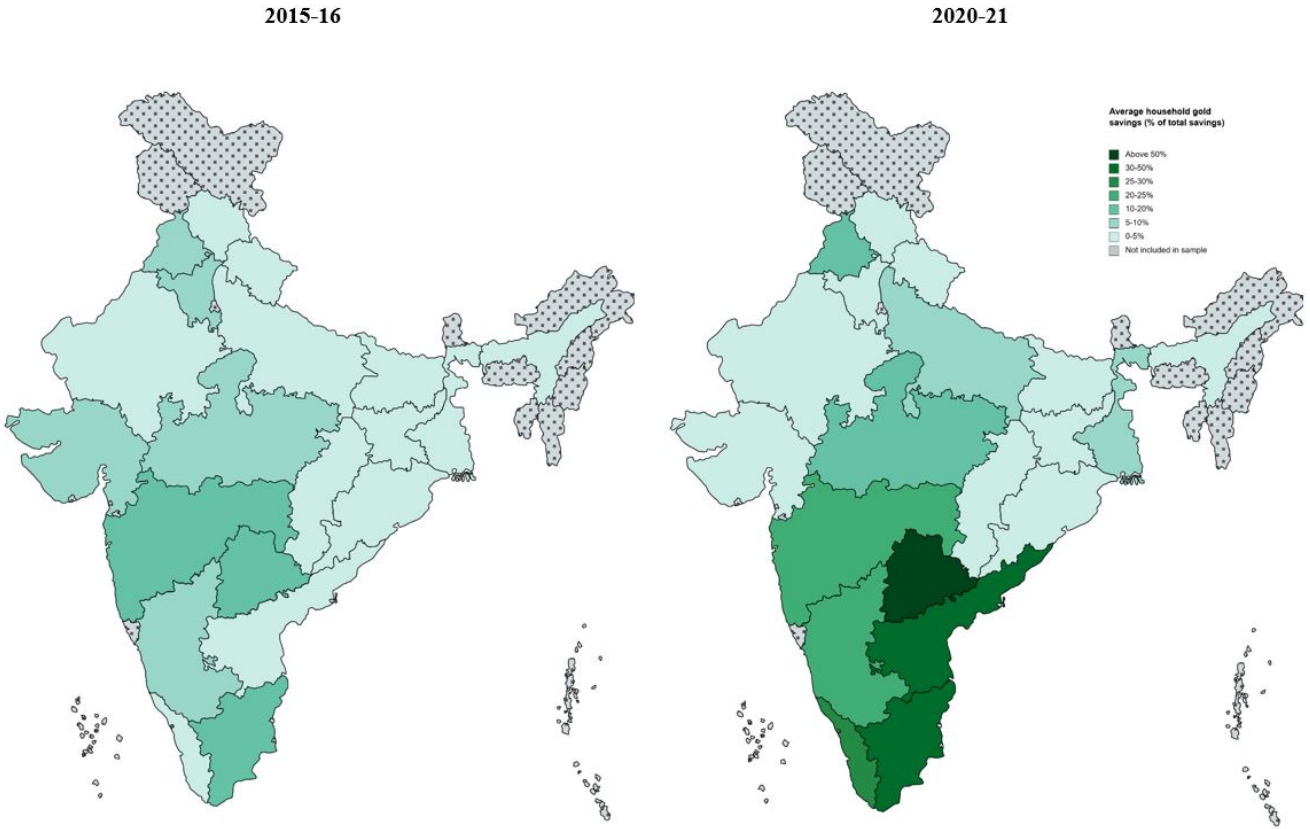
Figure 1: **Gold shares pre- and post-COVID-19**



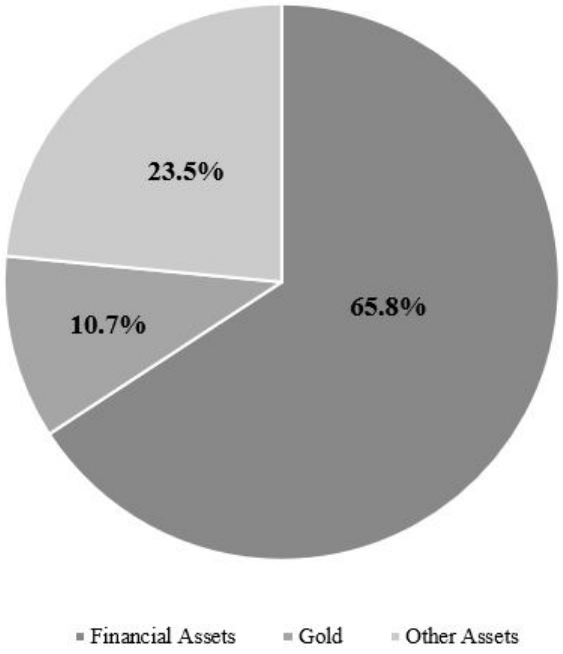
The figure shows the widening gap between average gold share in household portfolios in COVID-19 vulnerable districts (CVD) and other districts (non-CVD) for the pre-COVID and the COVID periods.

Figure 2: **Gold shares pre- and post-COVID-19**



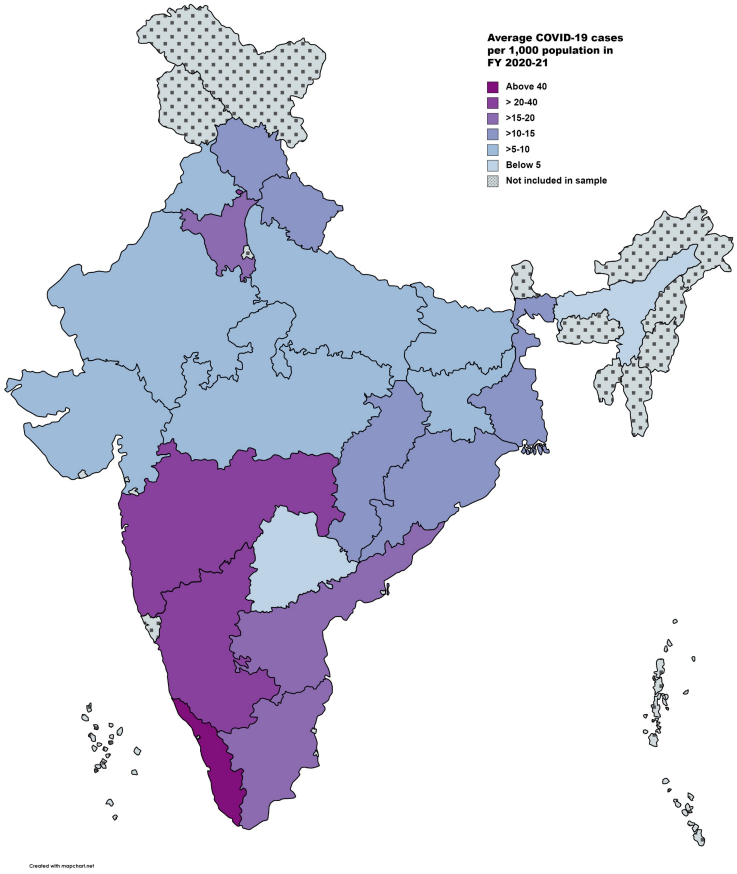
The figure shows the average gold savings in household portfolios aggregated at the state-level based on the surveys conducted in 2015-16 and 2020-21.

Figure 3: **Household Portfolio**



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

Figure 4: **Average COVID-19 cases per 100,000 population**



The figure shows the average monthly 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 of cumulative monthly COVID-19 cases at district level per 1000 population recorded in the year 2020-21.	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 investment, in all 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 investment 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 invested 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 invested in financial assets.	Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021
Others amount	The variable measures the amount invested in other assets like 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 indicates whether the household belong to rural or urban sector.	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 indicates the household head (CWE) is male or female.	Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021
Married household head	The dummy variable indicates whether household head (CWE) is married or unmarried.	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 indicates whether household head (CWE) is college educated or 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.
Female_Hh	The binary variable takes value 1 for households with female household head (CWE), and 0 otherwise.	Authors' calculations based on IGPC-PRICE Household Survey of Gold Consumption 2020-2021
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 1,00,000 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
Female_Hh	21,611	0.100	0.300	0.000	0.000	0.000	0.000	1.000
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) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) are the Gold share, Fin. assets share and Other share, which are the portfolio holdings of the households in percentage terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.

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, Fin. assets share and Other share, which are the portfolio holdings of the households in percentage terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.

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) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) and (4)-(6) are the Gold share, Fin. assets share and Other share, which are the portfolio holdings of the households in percentage terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.

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) 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, Fin. assets share and Other share, which are the portfolio holdings of the households in percentage terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.

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	-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) 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, Fin. assets share and Other share, which are the portfolio holdings of the households in percentage terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.

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) in the 2020-21 financial year. The dependent variables shown in columns (1)-(3) are the amount invested in Gold, Fin. assets and Others, which are the portfolio holdings of the households in absolute terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.

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) 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, Fin. assets share and Other share in that order, which are the portfolio holdings of the households in percentage terms. The definition of the variables are provided in Table 1. *No. of observations* denotes the number of households in the estimation sample. The significance levels are denoted by ***, **, * for 1%, 5% and 10% levels respectively. Heteroskedasticity consistent robust standard errors clustered at the block level are shown in round brackets. Blocks are the administrative subdivisions of respective Indian districts.