Indian Institute of Management Calcutta

Working Paper Series

WPS No. 905 / October 2023

Consumption Volatility and Shock: A Heterogeneity Analysis Using Panel of Indian Households

Manisha Chakrabarty*
Professor
Indian Institute of Management Calcutta
Email: mchakrabarty@iimcal.ac.in

Swathysree S S
Assistant Professor
Jindal Global Business School, O P Jindal Global University.
Email: swathysree@jgu.edu.in

* Corresponding author

Indian Institute of Management Calcutta, Joka, D.H. Road, Kolkata 700104

URL: https://www.iimcal.ac.in/faculty/publications/working-papers/

Consumption Volatility and Shock: A Heterogeneity Analysis Using Panel of Indian Households

Manisha Chakrabarty and Swathysree S S

Abstract:

We examine the ability of Indian households to absorb income shocks using household level consumption expenditure data between January 2016 and April 2022. We measure income volatility and evaluate the impact of income volatility on household welfare by estimating intertemporal consumption equation. We find that consumption volatility has increased significantly for lower income quantile, lower caste and Muslim households, the traditionally vulnerable population of India relative to others, indicating their inability to absorb income shocks. Their low levels of assets holdings and lack of access to credit could explain the substantially higher welfare loss they faced compared to others.

Keywords: Household Welfare, Income Volatility, Consumption Volatility, Liquidity Constraint

JEL Code: E21, D12, D91

Introduction

The paper aims to evaluate the impact of income shocks on household welfare by looking at the consumption volatility. One of the recent examples of income shock is the COVID-19 pandemic-induced lockdown and consequent employment loss. How households respond to income shocks has been a matter of interest for economists as it has significant implications for macroeconomic policy making (Jappelli & Pistaferri, 2010). It has been demonstrated in the previous studies that households' consumption response to income shocks vary depending on whether the change in income is anticipated or not. Under the permanent income hypothesis it is stated that consumption responses to transitory income shocks are likely to be less compared to a permanent income shock (Jappelli & Pistaferri, 2010, 2017).

The extant literature shows that it is plausible to prevent the adverse impacts of income shocks on household welfare to some extent if households can smooth their consumption (Blundell et al., 2008; Dogra & Gorbachev, 2016; Gorbachev, 2011). For instance, access to credit, savings, extended family networks, government policy measures like unemployment insurance may provide some form of insurance to households against income shocks. In other words, households with unconstrained liquidity are insured against income shocks as they can smooth the effect of these shocks. However, if the households face a liquidity constraint, their ability to smooth the effect of income uncertainties reduces. Thus, the impact of income uncertainty on household welfare depends on whether income uncertainty has caused volatility in consumption or not (Dogra & Gorbachev, 2016). This paper uses a long panel data of consumption expenditure of Indian households to examine whether income shocks translate to consumption volatility, thereby affecting household welfare. We consider only households that are liquidity unconstrained in our analysis and check whether they could smooth their inter-period consumption expenditure and lower the volatility in consumption when faced with income uncertainty. Our period of analysis include an unanticipated shock like the COVID-19 pandemic.

Data

We use data from the Consumer Pyramid Household Survey (CPHS) conducted by the Centre for Monitoring the Indian Economy (CMIE). In this household-level longitudinal survey, CMIE has covered around 236,000 unique Indian households since 2014. This comprehensive survey of Indian households provides information on household demographics, employment, income and expenditure, assets and liabilities, etc. The data is collected in waves. A wave refers to a period of four months. In a year, there are three wave and each wave starts in the months of January, May, and September respectively every year. The first wave of surveys was conducted between January and April 2014. This paper considers data from January 2016 to April 2022. The reason for not considering the first six waves (January 2014 to December 2015) is that the changes in definitions and survey categories post-2015 led to considerable variations in the proportion of households with borrowings from 2016 onwards. We retain only those households that are present across all the 20 waves. We keep only those households whose head was between the age of 17 and 65, i.e., only those who are not students and are not retirees. We also consider only households that we classify as liquidity unconstrained. We define the criteria based on which we classify a household as liquidity unconstrained later and explain in detail why we keep only liquidity unconstrained households.

Methodology:

We begin our evaluation of the effect of income shocks on household welfare by tracing the volatility in raw income and consumption from January 2016 to April 2022. We calculate volatility in income using raw income data of the households. We define raw income volatility as the square of log change in income for each household as a difference between income in the current wave and income in the corresponding wave of the previous year. We then average over all the households in our sample to arrive at the wave-wise raw income volatility measure. Figure 1 depicts the raw income volatility. It is discernible from Figure 1 that there was a significant increase in income volatility during wave 2 of 2020 (wave 14). The fact that this period corresponds to the first COVID-19 lockdown in India points to the severity of the income shock caused by the COVID-19 pandemic. However, this measure of income volatility from raw income data is purely for descriptive purposes and this is unconditional. We also estimate the income volatility of the household after conditioning household level characteristics which play a crucial role in determining income (Gorbachev, 2011).

As we would like to examine the link between volatility in income and consumption, we also compute consumption volatility using raw consumption expenditure data of households from January 2016 to April 2022. We use the data on non-durable consumption expenditure for our analysis. Like the definition of raw income volatility, we define raw consumption volatility as the square of the difference between log-transformed consumption expenditure of each household in a particular wave in a year and the corresponding wave in the previous year. We find that consumption volatility increased during the first lockdown period of the COVID-19 pandemic in India, i.e., wave 2 of 2020 (See Figure 2), like income volatility but with a lower magnitude. Though measurement of consumption volatility based on raw data is not an appropriate way of analysing variability in consumption when the focus is to evaluate the welfare implications of an income shock, the increase in raw consumption volatility observed during pandemic points to the fact that Indian households could not absorb the unanticipated income shock due to the pandemic. We also note that the consumption expenditure of households were more volatile than average income, particularly in case of poorest and richest households (See Appendix Figure A1 & A2)

Figure 1: Raw income volatility

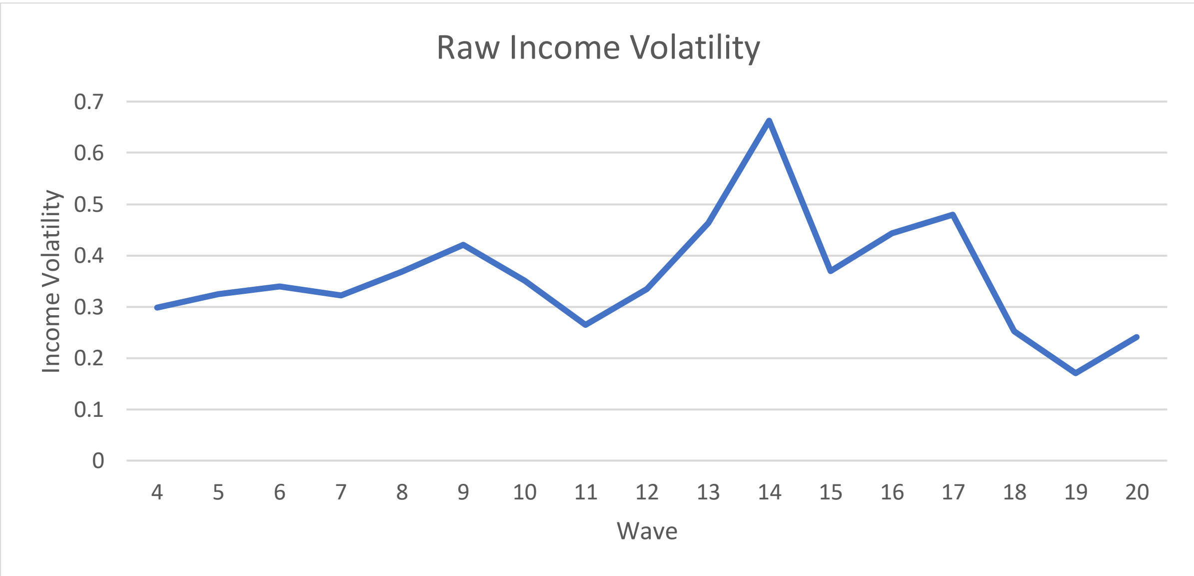
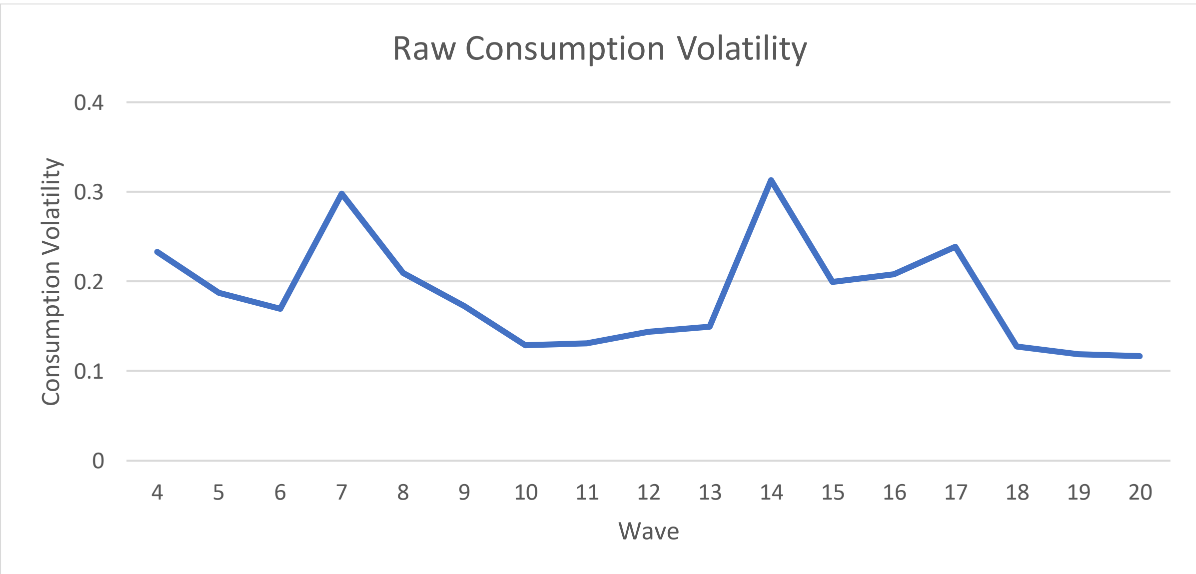


Figure 2: Raw Consumption Volatility



In order to measure income volatility, following Blundell, Pistaferri & Preston(2008) and Gorbachev(2011), we assume that the income of a household h can be represented as:

$$\ln(Y_{h,t}) = Z'_{h,t}\vartheta_t + P_{h,t} + v_{h,t} \rightarrow (1)$$

where t is time, Y is real income, and Z is a set of household characteristics that can be observed and vary over time. These characteristics include age, age squared, education, number of adults and children in the household and time dummies (See Table A1 for the results). The remaining part of the income of a household can be decomposed into a permanent component ($P_{h,t}$) and transitory mean-reverting component ($v_{h,t}$). The permanent income component follows a martingale process of the form: $P_{h,t} = P_{h,t-1} + \varsigma_{h,t}$ where $\varsigma_{h,t}$ is serially uncorrelated. We then measure income volatility, $\sigma^2_{h,t}$ as the square of the unexplained income growth component, comprising the household-specific time-varying shocks to permanent and transitory income. Thus, we can represent income volatility as:

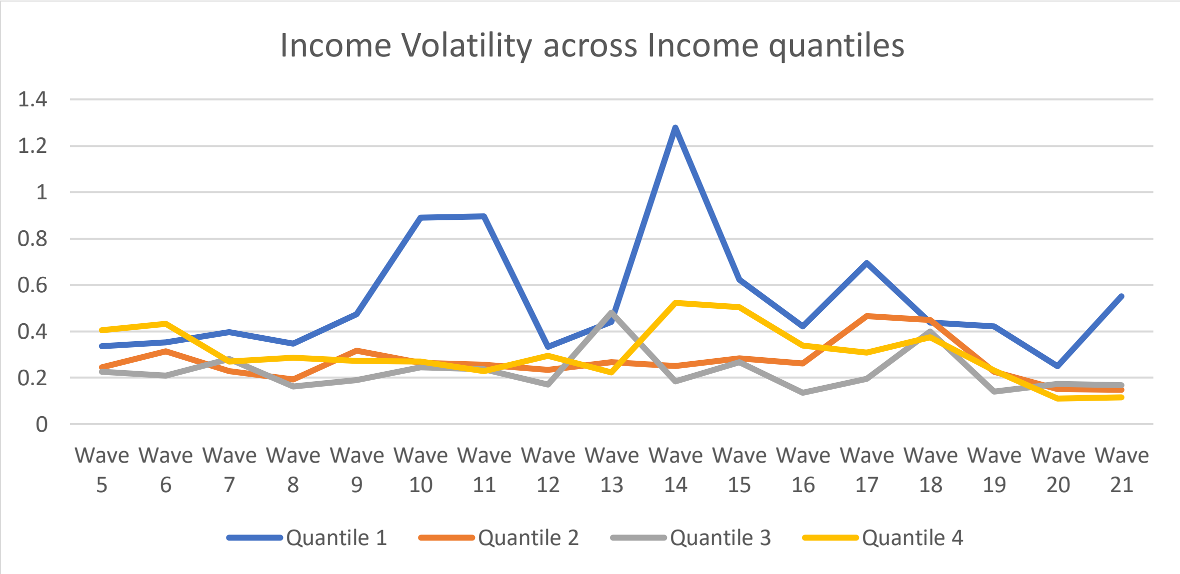
$$\sigma^2_{h,t} = (\varsigma_{h,t} + \Delta v_{h,t})^2 = \left(\Delta\ln(Y_{h,t}\right) - \Delta\ln(\widehat{Y_{h,t})})^2 \rightarrow (2)$$

As already stated, income volatility may not translate into consumption volatility and welfare loss if households can smooth their consumption by borrowing or liquidating their savings. Thus, in the absence of such insurances (or provisions), households will be unable to smooth out income shocks. Since we are interested in analysing the link between income volatility and consumption volatility, we keep liquidity unconstrained households as part of our sample. However, there is no direct measure in our consumption expenditure data that describes credit constraints of households. Thus, we classify households as liquidity-unconstrained households if the household head is educated and employed. The extant literature has shown that educated and employed people face lower rejection of credit/loan and has better access to credit markets.[1]

---

[1] Another definition we follow to classify a household as liquidity unconstrained is as follows: a household is liquidity unconstrained if the household head is educated and employed, household has no outstanding borrowing, owns house, and has financial assets and has bank account. Having a bank account could indicate the plausibility of getting a loan if the need arises. Similarly, ownership of assets is a better indicator that households can absorb shocks to their income. We use this definition for robustness purposes.

Figure 3: Conditional Income Volatility across Income quantiles



In Figure 3, we plot the conditional income volatility (as defined in equation (2)) across income quantiles. Figure 3 shows that depending on the location where the income of the household lies in the income distribution, there are some variations in the income volatility patterns. It is discernible from Figure 3 that households in the lowest quantile faced higher volatility in income compared to others. They faced a sharp increase in income volatility since wave 13 and 14, the period corresponding to first wave of COVID-19 pandemic in India. The volatility in income reduces after wave 14 but rose sharply during wave 17 (i.e., May 2021 to August 2021), the period that corresponds to the second lockdown in India. Even the richest households (quantile 4) saw increase in income volatility during wave 13 and 14.

Estimation of Consumption Volatility

To examine the phenomenon of welfare loss due to increased consumption volatility caused by income shock , we construct a consumption volatility measure by estimating Euler equation, which provides us an estimate of expected growth in household consumption. We define consumption volatility as the square of the difference between actual and expected consumption growth, i.e., the square of unpredictable components or residuals of the Euler equation. Unpredictable and predictable changes have different implications for household welfare (Jappelli & Pistaferri, 2017). Predictable changes like change in taste and preference may not affect the household welfare but unpredictable changes arising due to uncertainty would unambiguously affect the household welfare adversely if the households are unable to insure them against such income shocks.

A typical Euler equation can be represented as equation (3), where h refers to household and t is the time period. $C_{h,t}$ is the real consumption of the household h in period t; $\theta_{h,t}$ refers to the household h's tastes and δ_h is the rate of time preference of household h and is assumed to be specific to households and time invariant. E_t is the expectation operator which is conditional on all the information available at time point t and $r_{h;t+1}$ is the ex-post real risk free return on assets held by the household h between time t and t+1 and $\lambda_{h;t+1}$ is the extra utility that household h receives from borrowing and consuming an extra dollar, which will also reduce the consumption next period to repay the debt.

$$E_t\left[\frac{U'(C_{h,t+1};\theta_{h;t+1})(1+r_{h;t+1})(1+\lambda_{h;t+1})}{U'(C_{h,t};\theta_{h;t})(1+\delta_h)}\right] = 1 \qquad \rightarrow (3)$$

Assuming a standard utility function with a constant relative risk aversion where $C_{h,t}$ is the real consumption of the household h in period t, $\theta_{h,t}$ refers to the taste and preferences of household h and γ to the co-efficient of relative risk aversion.

$$U\left(C_{h,t};\theta_{h,t}\right) = e^{\theta_{h,t}}\left[\frac{C_{h,t}}{1-\gamma}\right]^{1-\gamma} \qquad \rightarrow (4)$$

and using the second order Taylor approximation of the above Euler equation we arrive at our estimating equation:

$$\Delta \ln C_{h,t+1} = \frac{1}{\gamma}\left[\Delta\theta_{h,t+1} + \ln\left(1+ r_{h,t+1}\right) + \ln\left(1+ \lambda_{h,t+1}\right) \qquad + \ln(1+ \delta_h)\right] - \frac{1}{(\gamma)} \times \Delta lncpi_{t+1} + z_{h,t+1} \rightarrow (5)$$

where, $z_{h,t+1} = \varsigma^c_{h,t+1} - \frac{V_t\epsilon_{h,t+1}}{2}$

$\Delta \ln C_{h,t+1}$ is the growth in the non-durable consumption expenditure of the household and is a function of observable variables that affect the preferences ($\theta_{h,t+1}$), the risk-free return of the assets the households hold ($\ln\left(1+ r_{h,t+1}\right)$), change in price level ($\Delta lncpi_{t+1}$), precautionary savings motive ($V_t\epsilon_{h,t+1}$) capturing uncertainty of expectation error and idiosyncratic shocks to consumption growth ($\varsigma^C_{h,t+1}$). If the liquidity constraint is not binding, then $\lambda_{h,t+1} = 0$.

Precautionary savings motive depends on households' expectations about income uncertainty or uncertainties about health; we proxy precautionary saving motive using estimated volatility of income from equation (2)

We follow Gorbachev (2011) and estimate the growth in consumption expenditure using a two-step Arellano-Bond GMM estimation[2]. We use lag one and two of explanatory variables as instruments (Attanasio & Low, 2004). We calculate household level volatility in consumption, by predicting the residuals from Euler equation (4) $[\widehat{z_{h,t+1}}]$ at first and then subtract household specific factors $(k_h)$and time fixed factors (τ_h). We then construct the consumption volatility measure as the square of the residuals $\varsigma^2_{h,t+1}$ = $[\widehat{z_{h,t+1}} - k_h - \tau_h]$.

Figure 4 shows the evolution of consumption volatility across income quantiles. During the pandemic period, volatility in consumption expenditure has been higher for poor households. Poor households saw an increase in volatility in wave 14, i.e., during the first lockdown period whereas other income groups saw an increase only in wave 15. This indicates that the income shock due to COVID-19 pandemic had an immediate impact on the consumption expenditure of poor households. In other words, this points to the fact that welfare loss has been more for the poorest households (income quantile 1). We also observe an increase in consumption volatility during wave 18 (September 2021 to December 2021. This was the phase of economic recovery in India with significant decline in mobility restrictions. The rise in consumption volatility suggests that drawing confidence in economic rebound, households have increased their consumption expenditure.

Next we attempt to do heterogeneity analysis in the consumption volatility of households by considering several household specific characteristics, $X_{h,t}$

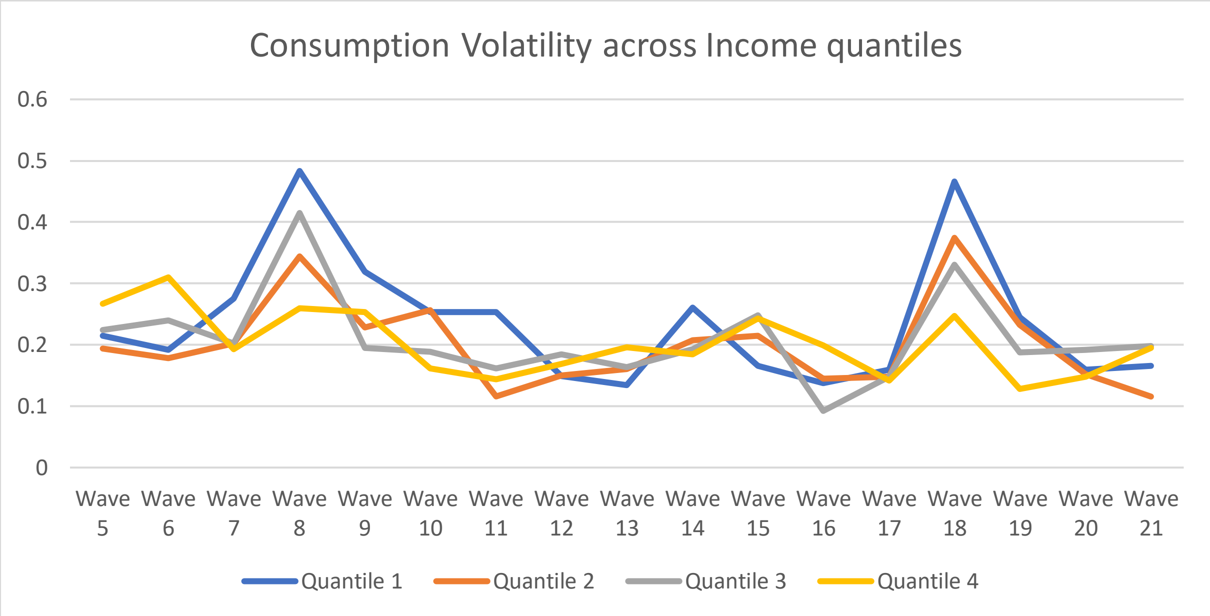
$$\widehat{\varsigma^2_{h,t+1}} = \beta_{0.g} + \beta_{1.g}t + X'_{h,t}\gamma_g + \omega_{h,t+1} \rightarrow (5)$$

In Table A3 and A4, we present the results of this heterogeneity analysis of consumption volatility where the household specific demographic characteristics considered are age, square of age, income group to which household belongs, income volatility quantile (i.e., the level of income volatility each household faced), whether the household has borrowing, whether the household owns house and assets, religion, caste and region to which the household belongs

[2] Estimates of Euler equation using GMM estimation strategy is available on request. In the appendix, we provide the detailed estimates of Euler equation using fixed effect estimation strategy.

and a dummy variable capturing the COVID-19 pandemic phase. To examine whether the level of consumption volatility households face varies (increases) during COVID-19 pandemic based on the income volatility levels, we interact the dummy variable, covid, which takes value 1 during the phases of pandemic and 0 otherwise, with the income volatility quantiles (See Table A4).

Figure 4: Volatility of household consumption expenditure across income quantiles



Our results show that not all households faced same level of consumption volatility. For instance, relative to households with higher level of income, households with lower levels of income (income quantile = Q1) faced significantly higher levels of consumption volatility. Households across the income quantiles have witnessed a fall in their average consumption expenditure around wave 13 and 14 (see Appendix Figure A2). We also observe that the consumption expenditure of households in higher income quantiles recovered from the pandemic-induced income shock post wave-15. However, the average consumption expenditure of poor income quantile households did not bounce back, indicating the severity of the income shock.

Similarly, relative to the households with lower level of income volatility, households with higher levels of income volatility (income volatility quantile = Q4) faced higher levels of consumption volatility (See Table A3 and A4). We also find that during the waves corresponding to pandemic (covid = 1), households face less consumption volatility, and this implies rather than taking risk, households are smoothing their consumption by holding their current consumption to protect themselves from the income shock induced by the pandemic. In comparison to households belonging to the SC/ST caste category, the consumption volatility of OBC and upper caste households is much lower. Similar to this, households that practice Christianity or the Sikh religion tend to have significantly less volatility in consumption expenditure than Muslim households.

In a nutshell, even though we observe that both bottom and top-most income quantile households (particularly during the pandemic) faced a greater increase in income volatility (See Figure 3), conventionally vulnerable households, i.e., households that belong to lower income, lower caste, and Muslim community experienced a significantly higher increase in consumption volatility during our study period. An increase in the volatility of their consumption expenditure relative to others indicates that income shocks have negatively affected the welfare of these households. A plausible reason why they could not absorb the income shock to the same extent as the other households (i.e., households with higher income, belonging to upper caste groups, and practicing other religions) could be that in the Indian context, these households have been historically both socially and economically vulnerable with low levels of asset holdings and lack of access to credit(Sachar Committee, 2006).

Conclusion

We examine the ability of Indian households to absorb shocks to their income. In other words, we study the impact of income shocks on household welfare by estimating the intertemporal consumption equation, and we also explore the heterogeneous effects of income shocks on the welfare of households across the income distribution and among different social groups. We find that income volatility increased for households across all income quantiles. However, the households belonging to traditionally vulnerable sections of Indian society experienced significant welfare cost due to their inability to absorb the shocks to income. In this paper, we focused only on the ability of liquidity unconstrained households to smooth income shocks; however, in the future, we intend to also explore the ability of liquidity constrained households to respond to income shocks.

References

Attanasio, O. P., & Low, H. (2004). Estimating Euler equations. *Review of Economic Dynamics*, *7*(2), 406–435. https://doi.org/10.1016/j.red.2003.09.003

Blundell, R., Pistaferri, L., & Preston, I. (2008). Consumption inequality and partial insurance. *American Economic Review*, *98*(5), 1887–1891. https://doi.org/10.1257/aer.98.5.1887

Dogra, K., & Gorbachev, O. (2016). Consumption volatility , liquidity constraints and household welfare. *The Economic Journal*, *126*(597), 2012–2037.

Gorbachev, O. (2011). American Economic Association Did Household Consumption Become More Volatile. *American Economic Revier*, *101*(5), 2248–2270.

Jappelli, T., & Pistaferri, L. (2010). *The Consumption Response to Income Changes*. http://www.nber.org/papers/w15739

Jappelli, T., & Pistaferri, L. (2017). *The Economics of Consumption*. Oxford University Press.

Sachar Committee. (2006). *Prime Minister's High Level Committee Cabinet Secretariat Government of India A Report*.

Appendix:

Figure A1: Average income of the households across each income quantile

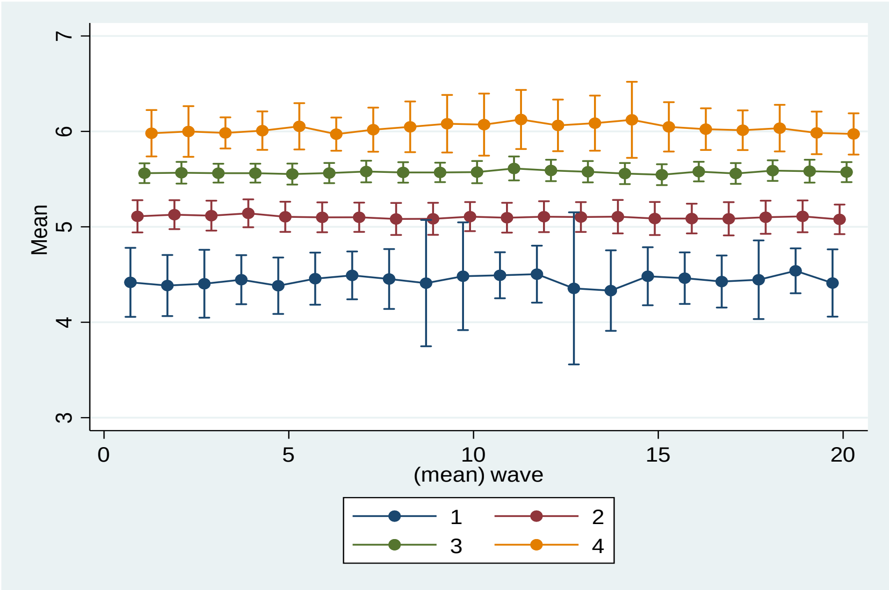


Figure A2: Average consumption expenditure of each household across income quantiles

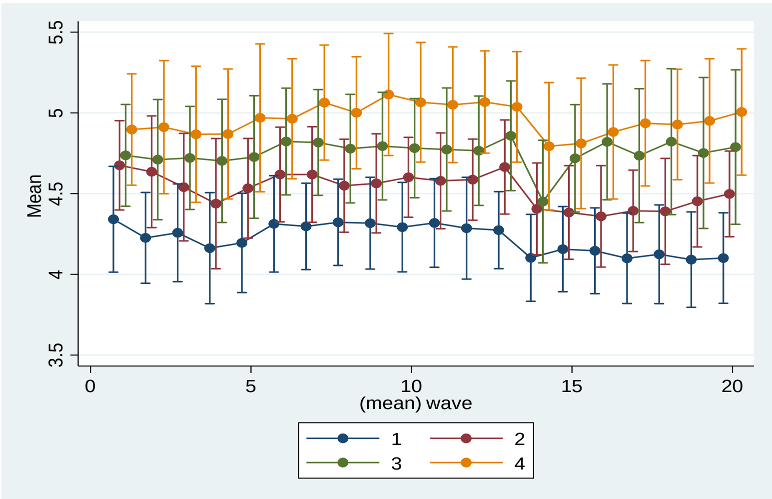


Table A1: Estimation of income volatility

Income Equation

	(1)
	ln_income_nonasset
age_yrs	0.0186
	(0.0198)
no_adult	0.0689***
	(0.0166)
no_child	0.0543**
	(0.0223)
edu_code=5	0.297***
	(0.0492)
age_yrs X age_yrs	-0.000152
	(0.000238)

wave fixed effects	Yes
Observations	9972
R^2	0.166

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

Table A2: Euler Equation estimation: Fixed Effects Regression Results

	(1) d_cons_exp
age_yrs	0.0233**
	(0.0107)
d_adult	0.0891***
	(0.00990)
d_child	0.0995***
	(0.0149)
ln_interest_rate	0.203
	(0.155)
ln_cpi	0
	(.)
income_vol	-0.00105
	(0.00313)
edu_code=Graduate & above	0.0475***
	(0.0155)
age_yrs X age_yrs	-0.000216*
	(0.000121)
wave fixed effects	Yes
Observations	8468
R^2	0.174

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

Table A3: Heterogeneity analysis of Consumption Volatility

	(1)	(2)	(3)	(4)
	cons_vol	cons_vol	cons_vol	cons_vol
age_yrs	-0.00826 (0.00585)	-0.00773 (0.00575)	-0.00769 (0.00589)	-0.00829 (0.00584)
age_yrs X age_yrs	0.000111 (0.0000661)	0.000106 (0.0000649)	0.000107 (0.0000663)	0.000111 (0.0000662)
Income quantile Q2	-0.0278 (0.0191)	-0.0287 (0.0193)	-0.0293 (0.0192)	-0.0278 (0.0189)

Q3	-0.0134 (0.0164)	-0.0132 (0.0167)	-0.0145 (0.0163)	-0.0134 (0.0164)
Q4	-0.0271* (0.0147)	-0.0289* (0.0142)	-0.0293* (0.0141)	-0.0270* (0.0144)
Income volatility Q1	-0.114*** (0.0215)	-0.116*** (0.0216)	-0.113*** (0.0211)	-0.115*** (0.0214)
Q2	-0.112*** (0.0185)	-0.113*** (0.0187)	-0.111*** (0.0184)	-0.112*** (0.0184)
Q3	-0.0890*** (0.0167)	-0.0900*** (0.0169)	-0.0886*** (0.0166)	-0.0890*** (0.0166)
Has borrowing =Y	-0.00681 (0.0169)	-0.00819 (0.0169)	-0.00673 (0.0168)	-0.00684 (0.0168)
Has house & assets =Y	-0.100 (0.0693)	-0.104 (0.0691)	-0.100 (0.0696)	-0.100 (0.0694)
Religion= Sikh/Buddhist/ Christianity/Jain	-0.0433*** (0.0143)	-0.0426*** (0.0144)	-0.0430*** (0.0143)	-0.0433*** (0.0143)
Religion= Hindu	0.000108 (0.0165)	0.000475 (0.0166)	0.000251 (0.0166)	0.000106 (0.0165)
Caste=OBC/ Intermediate	-0.0234* (0.0117)	-0.0232* (0.0117)	-0.0235* (0.0117)	-0.0234* (0.0117)
Caste=Uppercaste	-0.0312** (0.0136)	-0.0312** (0.0136)	-0.0316** (0.0137)	-0.0312** (0.0136)
covid=1	-0.00562 (0.0252)	-0.0386* (0.0187)	-0.0206 (0.0237)	-0.00543 (0.0233)
URBAN	0.0343 (0.0247)	0.0343 (0.0250)	0.0340 (0.0248)	0.0343 (0.0248)
Constant	0.548*** (0.104)	0.544*** (0.101)	0.537*** (0.106)	0.548*** (0.103)
Observations	8468	8468	8468	8468
R^2	0.027	0.029	0.028	0.027

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010
Note: In equation (1), covid dummy takes value 1 during waves 13 to 18, otherwise 0. In equation (2), covid dummy takes value 1 during waves 13 to 15, otherwise 0. In equation (3), covid dummy takes value 1 from wave 13 and above, otherwise 0. In equation (4), covid dummy takes value 1 during waves 13 to 17, otherwise 0.

Table A4: Heterogeneity analysis of Consumption Volatility

	(1)	(2)	(3)	(4)

	cons_vol	cons_vol	cons_vol	cons_vol
age_yrs	-0.00817 (0.00595)	-0.00758 (0.00581)	-0.00761 (0.00586)	-0.00819 (0.00593)
age_yrs X age_yrs	0.000109 (0.0000670)	0.000104 (0.0000654)	0.000106 (0.0000657)	0.000110 (0.0000670)
Income Quantile Q2	-0.0281 (0.0190)	-0.0289 (0.0188)	-0.0291 (0.0192)	-0.0281 (0.0186)
Q3	-0.0136 (0.0159)	-0.0136 (0.0163)	-0.0142 (0.0160)	-0.0135 (0.0158)
Q4	-0.0273* (0.0142)	-0.0290* (0.0138)	-0.0290* (0.0138)	-0.0273* (0.0138)
Has borrowing =Y	-0.00682 (0.0170)	-0.00780 (0.0168)	-0.00659 (0.0166)	-0.00682 (0.0169)
Has house & assets =Y	-0.101 (0.0691)	-0.105 (0.0689)	-0.100 (0.0695)	-0.102 (0.0691)
Religion= Sikh/Buddhist/ Christianity/Jain	-0.0429*** (0.0143)	-0.0415** (0.0144)	-0.0425** (0.0149)	-0.0428*** (0.0142)
Religion= Hindu	0.000608 (0.0165)	0.00175 (0.0169)	0.000644 (0.0170)	0.000719 (0.0164)
Caste=OBC/ Intermediate	-0.0238* (0.0119)	-0.0239* (0.0119)	-0.0237* (0.0119)	-0.0238* (0.0118)
Caste=Uppercaste	-0.0315** (0.0138)	-0.0319** (0.0138)	-0.0318** (0.0139)	-0.0314** (0.0138)
covid=1	-0.0180 (0.0191)	-0.0547*** (0.0133)	-0.0289 (0.0213)	-0.0192 (0.0156)
Income volatility Q2	-0.00690 (0.00831)	-0.00524 (0.00730)	-0.00654 (0.0109)	-0.00618 (0.00688)
Q3	0.0211 (0.0125)	0.0249** (0.0108)	0.0211 (0.0137)	0.0213* (0.0120)
Q4	0.112*** (0.0301)	0.115*** (0.0247)	0.108*** (0.0323)	0.114*** (0.0284)
covid=1 X Income_vol Q2	0.0271 (0.0161)	0.0484** (0.0220)	0.0167 (0.0159)	0.0320** (0.0142)
covid=1 X Income_vol Q3	0.0130 (0.0250)	0.00844 (0.0200)	0.00579 (0.0220)	0.0169 (0.0263)
covid=1 X Income_vol Q4	0.00914 (0.0380)	0.00829 (0.0370)	0.0107 (0.0416)	0.00569 (0.0367)
URBAN	0.0345 (0.0248)	0.0346 (0.0251)	0.0340 (0.0249)	0.0345 (0.0249)
Constant	0.436*** (0.116)	0.428*** (0.112)	0.427*** (0.115)	0.436*** (0.115)

Observations	8468	8468	8468	8468
R^2	0.027	0.030	0.028	0.027

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Note: In equation (1), covid dummy takes value 1 during waves 13 to 18, otherwise 0. In equation (2), covid dummy takes value 1 during waves 13 to 15, otherwise 0. In equation (3), covid dummy takes value 1 from wave 13 and above, otherwise 0. In equation (4), covid dummy takes value 1 during waves 13 to 17, otherwise 0.