Cover Letter

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Date:07-08-2025

Subject: Application for Climate Finance Ph.D. workshop.

I am writing to apply for participation in the Climate Finance Ph.D. workshop organized by NBER. I am currently in my 3rd year of Ph.D. in the department of economic sciences, Indian Institute of Technology, Kanpur, India. I am expected to complete my Ph.D. in the year 2027.

My current work is on the effect of climate risk on inflation and monetary policy in India. Going forward, I want to work primarily on the interaction of climate change and monetary policy in India and other emerging economies.

I see this workshop as a great opportunity to deepen my expertise and receive valuable feedback from my peers and the experts working on similar research questions. have attached my CV as required.

Thank you for considering my application.

Abhisek Mohanty.

Reference:

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CV

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I am a Ph.D. student of economic sciences with a strong background in mathematics and statistics. My primary research interest lies in Central Bank Macroeconomics and Climate Finance.

Education

- **Indian Institute of Technology, Kanpur**

Ph.D. in Economic Sciences,2023-Present, *Coursework CGPA-9.4/10*

- **Centre For Economic Studies and Planning, JNU, New Delhi**

MA in Economics,2023, *CGPA-6.25/9*

Specialization: Game Theory, Econometrics, Network Theory

- **University Of Pune, Pune**

M.Sc. in Statistics,2020, *CGPA-6.15/10*

- **Institute of Mathematics and Applications, Bhubaneswar**

B.Sc. in Mathematics and Computing, 2018, *CGPA-6.48/10*

Conferences

- Presented the Paper "Use Pattern of Plastics and Constitution of India' in *International Conference on Law and Economics,* BBAU, Lucknow, 2023

Teaching Experience

- Teaching Assistant, *International Trade and Finance*, IIT Kanpur,2024
- Subject Matter Expert in Mathematics, Chegg, 2020-2023

Other Achievements

- Qualified and awarded UGC Junior Research Fellowship, 2021
- Cleared MA entrance examination of Delhi School of Economics,2021
- Two times finalists in DDM National IT quiz, Bhubaneswar

Other Information

- Software Skills: R, Minitab, MS Office
- Languages: Odia (Native), English, Hindi (Spoken)
- Hobbies: Quizzing, Football

Does Climate Risk Matter for Inflation and Monetary Policy? Fresh Evidence from India

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Abstract

Climate change is increasingly becoming a pressing factor in the global economic landscape. It is found to be affecting various facets of the global economy and the financial market. India, due to its geographical and economic conditions, is even more vulnerable to climate risk and its direct and indirect impacts on the economy. This study uses news data and textual analysis to build a novel climate risk index for India and employs a local projection method to find out the dynamic impact of climate risk on inflation. We find that the effect of climate risk on inflation is positive and persistent for a few months. Upon enquiring further, we find that the effect is mainly driven by food inflation and energy inflation. Food inflation shows a lagged and persistent impact of heightened climate risk, whereas the impact on energy inflation is immediate but short-lived. The difference in effects based on demography is also evident, with rural inflation being affected more and for a longer period, compared to urban inflation. We also analyse whether the Central Bank of India takes climate risk into account while formulating its policies. Although there is no evidence of policy rates being affected by climate risk, we find that money supply growth is affected positively, indicating a non-interest rate policy tool stance of the Reserve Bank of India towards climate risk.

JEL Codes: E31, E50, E52

Keywords: Climate Change, Inflation, Monetary Policy

1. Introduction

The issue of climate change has become increasingly concerning in the past few decades. Despite the efforts of the global leadership, the symptoms and consequences of climate change are more evident than ever before. The global temperature has been on an upward trend, and extreme weather events such as droughts, cyclones, and floods have become more frequent. According to estimates, the global temperature is likely to rise by 1.5 degrees Celsius above the pre-industrial levels by 2030 (World Meteorological Organisation).

Climate change poses a threat to global economic development in various ways. According to estimates by the International Disaster Database (EM-DAT), Economic losses from natural hazards amounted to USD 202.7 billion all over the world in 2023. Projections suggest that with current adaptation levels, a 4°C increase in global temperature by 2100 could lead to a 10 to 23 per cent decline in global Gross Domestic Product (The Intergovernmental Panel on Climate Change, 2023). These figures paint a grim picture of what damage climate change can do to the global economy and especially to developing economies like India. India, due to its geographical position and economic structure, remains largely vulnerable to climate change and its effects. According to Germanwatch, India is the 7th most vulnerable country with respect to climate extremes. In this backdrop, it is imperative to analyse the risks that climate change poses to the global economy, and in particular, developing economies like India.

The impact of climate change on various macroeconomic indicators has become a central concern of economic research. With respect to its impact on the economy and financial market, climate risk is generally categorised into two types: Physical risk and Transition risk (Network for Greening Financial System). Physical risk refers to the direct and physically manifested effects of climate change, such as cyclones and floods. Transition risk, on the other hand, refers

to the financial risk associated with transitioning to a low-carbon economy in order to mitigate the future intensity of climate change.

One of the key macroeconomic variables that climate change affects is inflation. Inflation is a complex macroeconomic phenomenon and requires careful monitoring. A small amount of inflation is encouraged to incentivise higher levels of production, whereas high inflation takes away the purchasing power of consumers and could push a large chunk of the population into poverty. According to a United Nations estimate, an additional 71 million people fell into poverty owing to high inflation, because of high food and energy prices following the Russia-Ukraine war (United Nations Development Programme, 2022). Climate change and the risks associated with it play a huge role in the trend of inflation, especially in climatically vulnerable regions like Africa and the Tropics (Molina et al., 2022). In particular, an emerging economy like that of India is more prone to climate risk-induced inflation. Not only does a large section of the employment in India occur in climatically vulnerable sectors like agriculture, but also a huge portion of India's population has income levels at the lower end of the spectrum, and for them, food takes up a major share of their consumption. Multiple transmission channels connect climate change to inflation. Climate-induced shocks exacerbate the low productivity issue Indian farmers have long been facing, and disrupt the global supply chain, leading to higher domestic prices. Climate change is also believed to complicate monetary policy decision-making, decreasing its effectiveness and leading to a high degree of uncertainty in inflation expectations (Gavriilidis, 2021; Liang et al., 2021). There is also literature suggesting that, because of its impact on inflation and growth, climate change risks are often incorporated by the central banks while choosing policy rates (Jawadi et al., 2024).

Very limited literature exists on the impact of climate change on inflation, largely because of the unavailability of appropriate climate risk measure data. Most of the existing literature uses annual and static climate risk measures that include only some specific component of climate

risk (e.g. temperature, sea level changes, etc). This approach fails to deal with the dynamic effects of climate risk and also fails to account for components like transition risk. Also, none of the studies so far have studied the response of the central bank to climate shocks.

The study is organised as follows: Section 2 discusses the existing literature on this topic and the literature gap that exists. Section 3 talks about the data and methodology. Section 4 discusses the empirical results obtained from the analysis. In section 5, we do robustness checks on our analysis and section 6 gives the conclusion and policy recommendations.

2. Literature Review

Climate change has emerged as a key structural determinant of several macroeconomic variables, with an increasing number of studies linking climate change risk to inflationary pressure. For our analysis, the relevant literature has various dimensions, such as measuring climate risk, the empirical methodology employed, and the relationship obtained between climate risk and inflation and consequently, central bank responses. The quantification of climate risk is foundational to analysing its effect on various macroeconomic variables such as inflation. Conventional proxies like temperature and precipitation levels continue to dominate empirical macroeconomic research. For example, Kotz et al. (2024) employ fixed-effects panel regressions across over 27,000 monthly Consumer Price Index observations worldwide, showing a positive impact of temperatures on inflation. Similarly, Li et al. (2023) use average temperature as a climate shock proxy in a balanced panel of 26 countries from 1995 to 2021 and find a positive association with inflation. In Indian context, Sengupta and Atal (2025) use sea level change as proxy for climate change risk and using vector autoregression (VAR) and vector error correction models (VECM) find that unit increase in their sea level-based climate index results in a 0.463% long-run increase in inflation, while the short run effect was found to be weak.

Recently, there have been several studies that have quantified climate risk using textual analysis. Engle et al. (2020) constructed a Climate Change News Index (CCNI) from the Wall Street Journal and further derived a Negative Climate News Index to isolate negative sentiment related to climate change. These indices served as proxies for shifts in market perception of climate risk. Similarly, Gavriilidis (2021) constructs a Climate Policy Uncertainty (CPU) Index using textual analysis of climate-related policy terms in U.S. newspapers. The CPU index reflects transition risks stemming from regulatory uncertainties related to climate-conscious behaviour.

Although most studies involving inflation and climate risk show a positive association, there are studies that show little or a negative impact of climate risk on inflation. For example, Kabundi et al. (2022) found that floods tend to have a decreasing effect on inflation. Cevik and Jalles (2023) found that extreme temperatures lead to lower inflation rates.

Consequently, since most central bank policies hugely depend on the inflation rate and growth rate in the economy, it is expected that climate risk also affects policy rates or the money supply in the economy. Jawadi et al. (2024) find that both physical risk and transition risk drive policy rates determined by the Fed in the United States, and that an augmented Taylor rule incorporating climate risk would fit better than the classic Taylor rule.

However, there is a scarcity of literature studying the effect of climate risk on inflation and consequently central bank responses in an emerging economy like India. There is also no comprehensive climate risk index data available for the Indian context. This paper will try to fill these gaps by building a news-based climate risk index. This paper also dives deep into how various components of inflation are affected by climate risk and how the Reserve Bank of India (RBI) has responded to the climate shocks.

3. Data and Methodology

3.1. Variables' Construction

The core explanatory variable in this paper is the climate risk index constructed using news data from a newspaper in India, '*The Times of India*'. The Times of India is the most-read English daily newspaper in India and has an archive of news going as far back as 2001. For our analysis, we used news headlines from April 2001 to June 2022. Following Engle et al. (2020) and Ahmad et al. (2024), we consider a set of keywords: black carbon, cap and trade, carbon intensity, carbon budget, carbon emission, carbon footprint, carbon market, carbon tax, climate change, climate crisis, climate feedback, CO2, conference of the parties, COP 16, COP 21, emissions trading, global warming, greenhouse effect, greenhouse gases, intergovernmental panel on climate change, IPCC, Kyoto protocol, Montreal protocol, Paris agreement, renewable energy, and UNFCCC. Although these keywords mostly represent transition risk, they also represent physical risk to some extent since, during a climate crisis, like floods, cyclones, etc., the conversation around climate change is more likely to intensify (Intergovernmental Panel on Climate Change; Torricelli,2023). We filter out news headlines having these keywords and determine the monthly volume of these headlines relative to the total number of headlines that month. The final climate risk index is arrived at by scaling the relative headline frequency by 1000.

Our dependent variable of interest is Consumer Price Index (CPI) inflation and its components, i.e. Core inflation, Food inflation, and Rural Inflation. Data for macroeconomic variables such as interest rate, inflation, Industrial Production Index, etc., were sourced from the CEIC database and the Federal Reserve Economic Database (FRED). Data on historical climate hazard events were sourced from the EM-DAT public database.

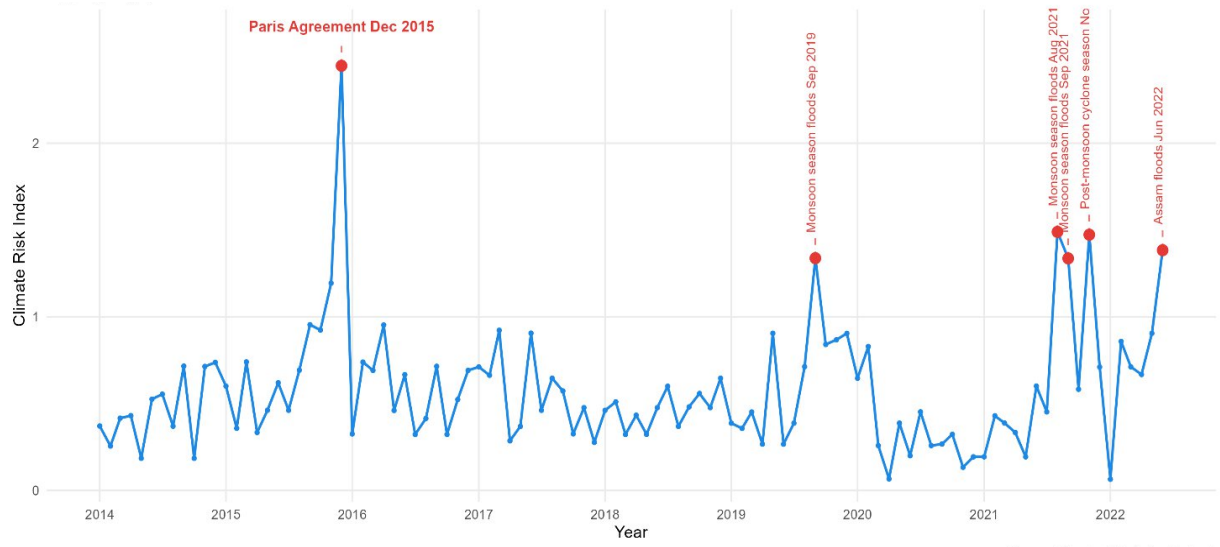


Figure 1: Monthly Climate Risk Index with annotations of major events

As can be seen from the above graph, the climate risk index shows a huge spike during the Paris Agreement of 2005. It also shows spikes largely during the peak monsoon and flood seasons in India.

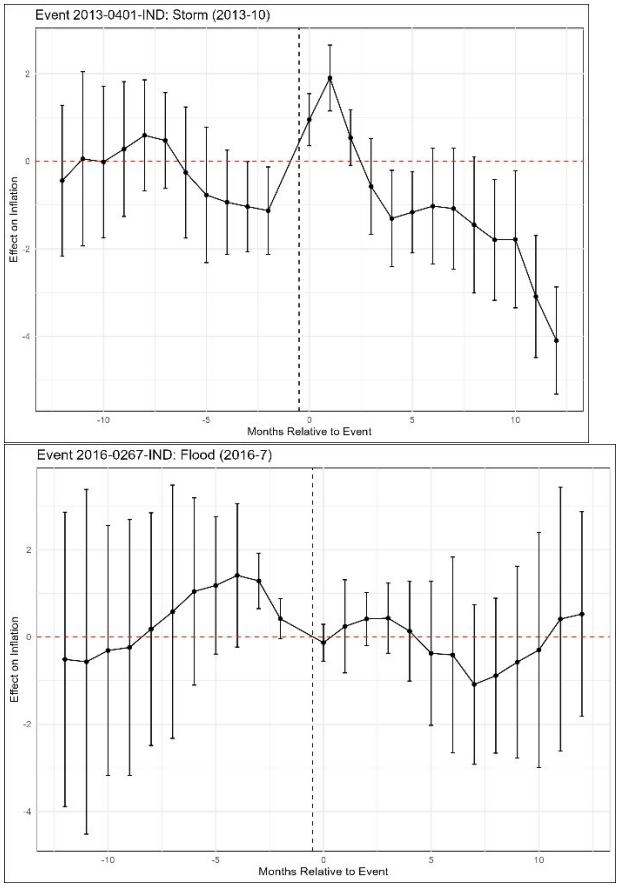
3.2. Event Studies of Natural Disasters

As a preliminary empirical study, we try to see if any of the natural disasters that occurred in different regions in India in the recent past have led to any changes in inflation in that region. For this, we do an event study of some natural disasters such as the 2013 cyclone in the state of Odisha, the multiple Assam floods, etc. For this, we considered the CPI inflation rates of Indian states from January 2012 to February 2025. We filtered the natural disasters based on the number of people affected as given in the EM-DAT database and took some of the events that affected a very large number of people.

The event study's specification is as follows

$$Inflation_{st} = \alpha_s + \gamma_t + \sum_{k \neq -1} \beta_k \cdot \text{Treated}_s \cdot \text{Period}_{t-k} + \varepsilon_{st}$$

where $Inflation_{st}$ denotes the inflation rate in state s and time t. α_s and γ_t are state and time fixed effects, respectively. A state is considered treated if the particular natural disaster affected that state. From the event study plots, it can be seen that the flood in 2017 and the cyclone in 2013 appear to be affecting inflation in the affected states. However, the other two natural disaster events taken here show no effect on inflation in the affected states. This presents an ambiguity regarding the effect of climate risk on inflation and calls for a deeper dive into our research question.



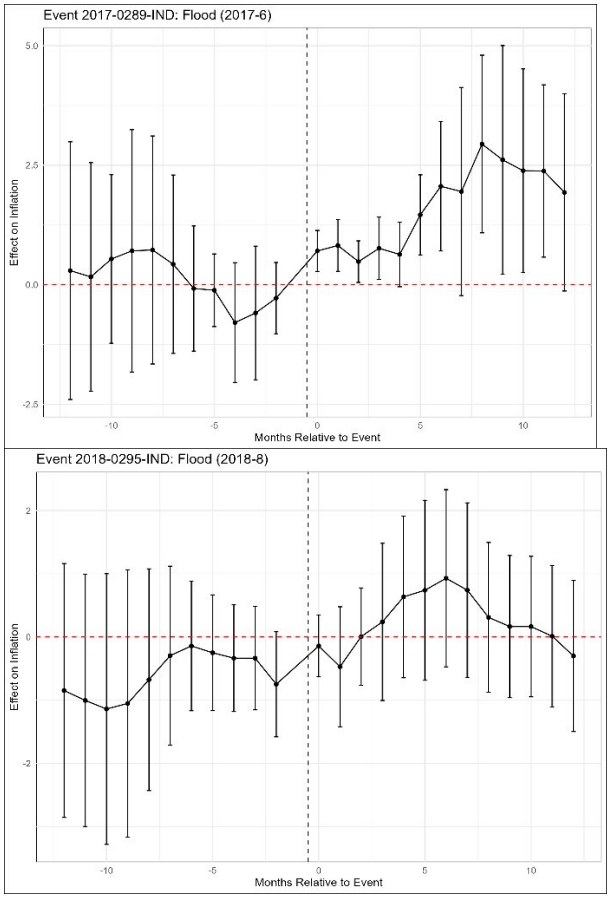


Figure 2: Event Studies of Floods and Cyclones

3.3. Local Projection

Local projection was developed by Oscar Jorda (2005) to estimate impulse response functions flexibly without VAR restrictions (Jorda, 2005). It involves directly estimating regressions of future outcomes on current covariates at each horizon, offering a robust alternative to traditional methods like vector autoregressions (VARs), especially when dealing with misspecification or needing to analyse impulse responses at different time horizons (Plagborg-Moller & Wolf, 2021). It handles nonlinear and state-dependent effects; thus, it is useful for macroeconomic asymmetries (Ramey & Zubairy, 2018). It also handles non-stationarity better and avoids the need for differencing or cointegration as horizon-based regressions reduce sensitivity to non-stationary data (Montiel Olea & Plagborg-Moller, 2021).

Owing to the dynamic, persistent nature of inflation and non-stationarity of macroeconomic variables like interest rate, industrial production etc., Local projection is well suited for our

analysis. Thus, a dynamic local projection model is used to analyse the effect of climate risk on inflation and monetary variables.

The model specification is as follows

$$y_{t+h} = \alpha^h + \beta^h_{\text{climate}}\text{CRI}_t + \sum_{j=1}^{p}\gamma^h_j \mathbf{X}_{t-j} + \sum_{j=1}^{q}\delta^h_j y_{t-j} + \sum_{s=1}^{11}\theta^h_s D^s_t + \varepsilon^h_{t+h}$$

where, y_{t+h} is the dependent variable of interest at time t + h. CRI_t is our key explanatory variable that denotes the climate risk index in month t. X_{t-j} is a vector of control variables with lag upto the order j. D^s_t are seasonal dummy variables and ϵ^h_{t+h} is the error term at horizon h.

Our variable of interest is $\beta^h_{climate}$ which gives us the impulse responses at horizon h. The confidence intervals are constructed using Newey-West standard errors to account for serial correlation and heteroskedasticity. The serial correlation correction uses lag length h for the Newey-West estimator. Vector X includes macroeconomic factors that could influence both climate risk and the dependent variable. Including sufficient lags helps address endogeneity concerns. Month dummies account for recurring seasonal patterns. Our Identification assumption here is that Climate index variations provide exogenous variation after controlling for lags and other factors. This assumption is in line with similar empirical studies using other climate risk related proxies like Ciccarelli and Marotta (2024), Gallic and Vermandel (2020), and others.

4. Empirical Results

4.1.Climate Risk Impact on Inflation

Figure 3 presents the impulse response function of headline Consumer Price Index (CPI) inflation to changes in the climate risk index. We see that climate risk significantly affects CPI inflation starting from month 3, and the effect is cyclical. One unit increase in the climate risk index leads to up-to 0.7 percentage points increase in the inflation rate. This lagged and cyclical trend of effect could be explained by the following factors. (i) Climate events usually have a

lagged effect on supply pressures via crop damaging and supply chain pressures (ii) Since CPI has higher cyclical and seasonal components like food and services, the effect of climate shocks on inflation appears cyclical due to inflationary periods and subsequent recovery periods. These findings are in line with the findings in existing literature (Cevik and Jalles, 2023).

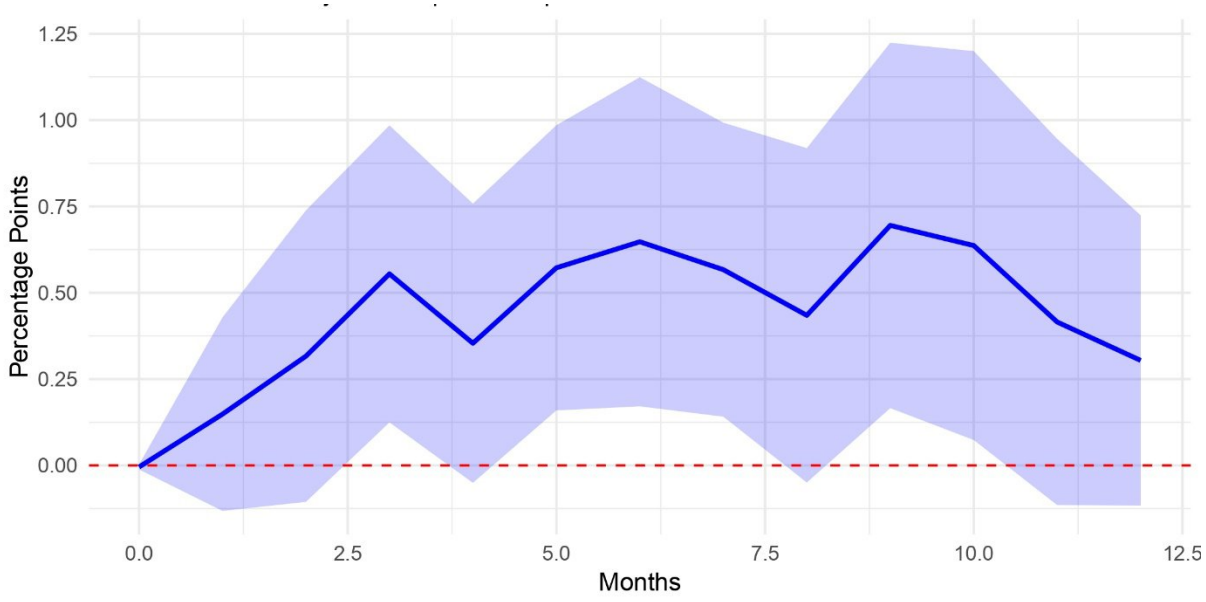


Figure 3: Impulse Response Function of CPI inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

Figures 4,5, and 6 present the impulse response function of energy inflation, core inflation, and food inflation, respectively. We see that the effect on core inflation remains downward and statistically insignificant across all horizons. This finding is in line with the findings of Cevik and Jalles (2023), who found that temperature shocks and drought shocks have a largely deflationary and statistically insignificant effect, especially in developing countries (Cevik and Jalles, 2023). Energy inflation, on the other hand, shows an immediate increase that is significant at the 90% level but soon tapers off to baseline. Climate shocks directly affect fuel and electricity supply, causing an immediate supply pressure, leading to a price surge. Once initial shortages are dealt with, energy prices fall back quickly. Existing research shows that

energy-driven inflation is mostly short-lived and has very limited pass-through to core inflation (Centre for Economic Policy Research,2023).

The highest and most persistent effect climate risk has is on food inflation. Food inflation spikes after around 6-8 months, up to 2 percentage points, after a climate shock, before subsequently receding. This is expected for a tropical country like India, where agriculture largely depends on monsoon behaviour. The Economic Survey, 2024 of India also links extreme weather events to persistent food inflation (Economic Survey,2024). This effect is further magnified by inadequate storage infrastructure and irrigation facilities in the country. Climate shocks disrupt the crop cycle and affect harvesting, but become apparent in inflation after a lag of a few months. And literature suggests that this effect, to some extent, is likely to pass through to the global prices as well since India is one of the major food exporters (Budebes et al., 2025). Market interventions like export bans usually come into effect weeks or months later, stabilising the food prices. Further, the effects on food inflation are largely responsible for the changes in CPI inflation, as food constitutes almost 45% of the CPI basket in India.

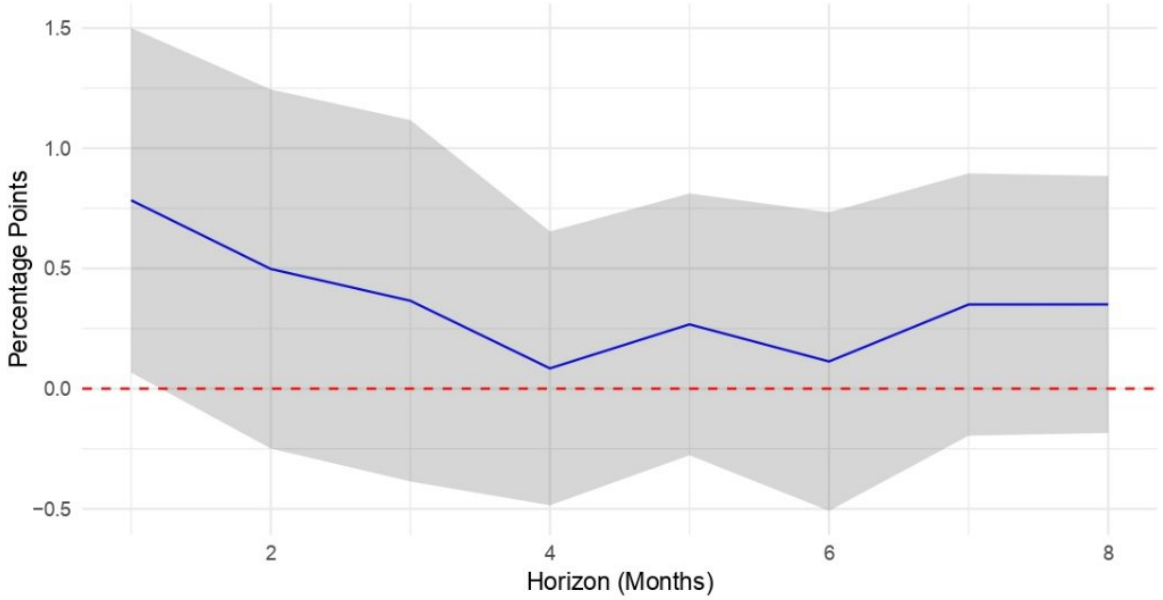


Figure 4: Impulse Response Function of energy inflation with Local Projection 90% Confidence Intervals
Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

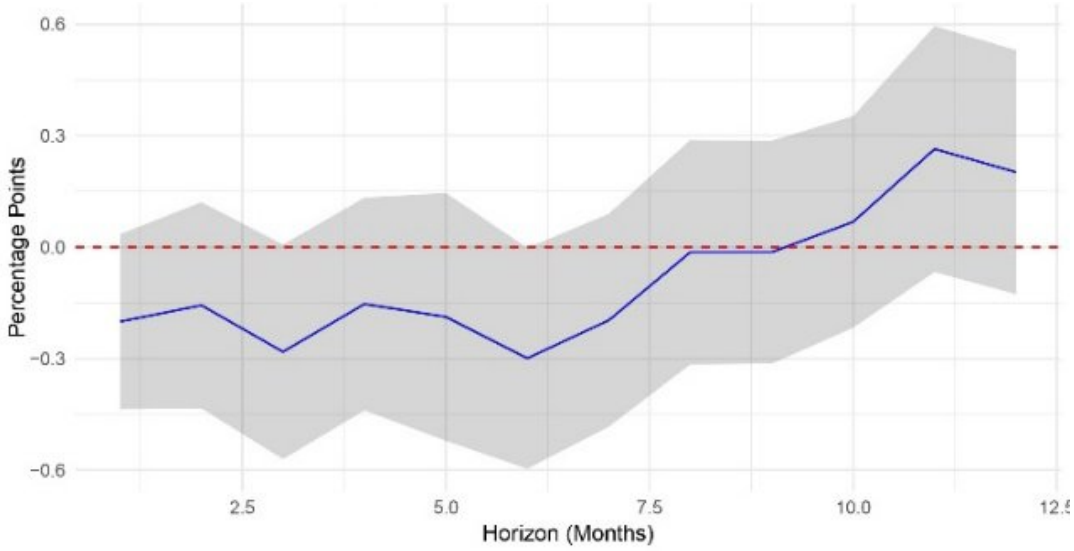


Figure 5: Impulse Response Function of Core Inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

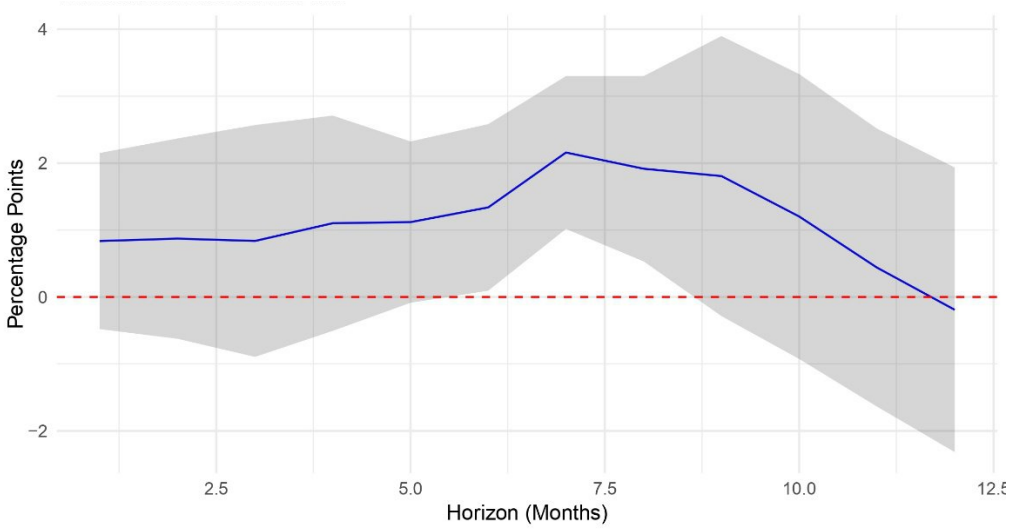


Figure 6: Impulse Response Function of Food Inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

Figure 7 and Figure 8 present the impulse response functions of rural and urban inflation, respectively. The trajectory of rural inflation is quite similar to that of food inflation. One unit increase in the climate risk index leads to up to a 1.3 percentage point increase in rural inflation. The effect on rural inflation is found to be more persistent compared to urban inflation. The

effect on rural inflation is statistically significant up to around the 10th month after the shock, whereas that of urban inflation is relatively short-lived. The differential effect is largely due to a larger share of food in the rural CPI as compared to that in the urban CPI. Thus, food price movements dominate rural inflation dynamics and hence show a larger effect due to climate-induced shocks. Also, rural households in India still largely depend on unregulated traditional fuel sources like wood, cow dung, etc, which might further exacerbate the inflationary pressures of climate shocks. On the other hand, the urban consumption basket has a high share of housing and services, which usually have slow-moving price dynamics. Further, urban areas have better infrastructure, storage facilities, and logistics systems, which moderate climate-induced supply chain pressure compared to rural areas. The heightened rural inflation sensitivity was also evident during the covid pandemic because of supply chain disruptions (Mahajan,2020).

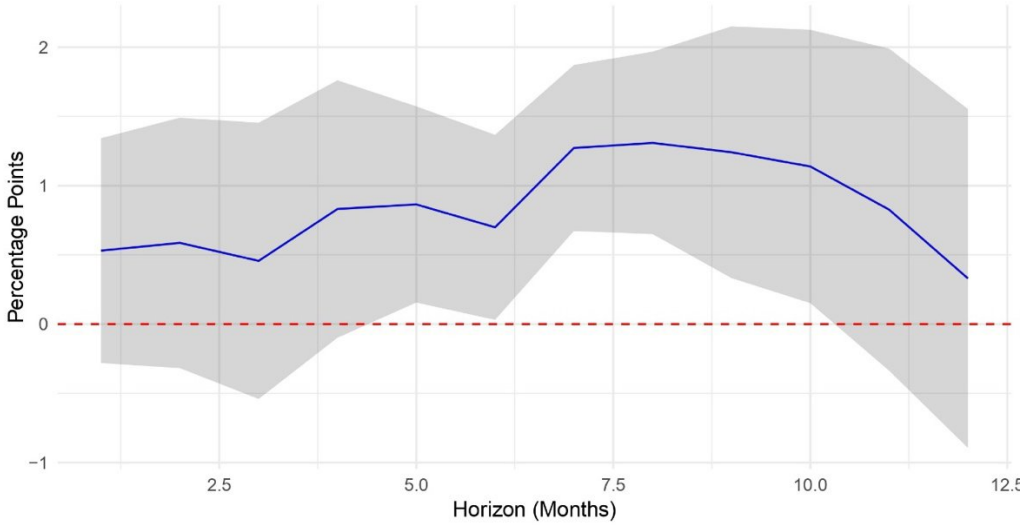


Figure 7: Impulse response function of rural inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

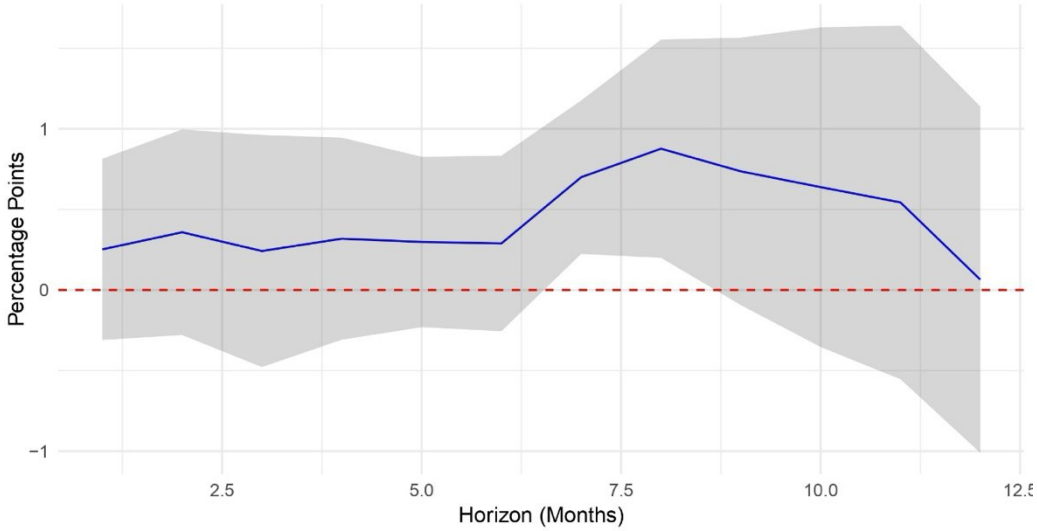


Figure 8: Impulse response function of Urban Inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

4.2. Monetary Responses to Climate Shocks

As evident in our analysis, climate risk does indeed lead to heightened inflation in India. Although climate shocks are mostly found to affect the inflation dynamics through supply-side pressures, central banks are starting to take note of them and adapting their policies to account for climate-induced shocks (Jawadi et al.,2024). So, it is interesting to see whether the Reserve Bank of India, which is the central bank of India, considers climate shocks in its policy making. Whether climate-induced risk also affects the monetary variables and liquidity in the context of the Indian economy.

Figure 9 presents the impulse response function of the repo rate to an increase in the climate risk index. Repo rate or the Repurchase rate is the interest rate at which the RBI lends money to commercial banks. It is the primary policy rate used by the RBI in its inflation management. The figure shows that although the point estimates are slightly negative, the repo rate is not significantly affected by the climate shocks in all horizons. The result remains statistically insignificant even when lagged values of repo rates are controlled for. It could possibly be due to the fact that in the Indian context, -the effect of climate risk largely happens through supply side pressures, where the monetary policy rates have little to no role. Also, RBI might consider

these climate risks as transitory and temporary which was also evident from the fact that most inflationary effects of climate risk tapered off after a certain period in the impulse response plots.

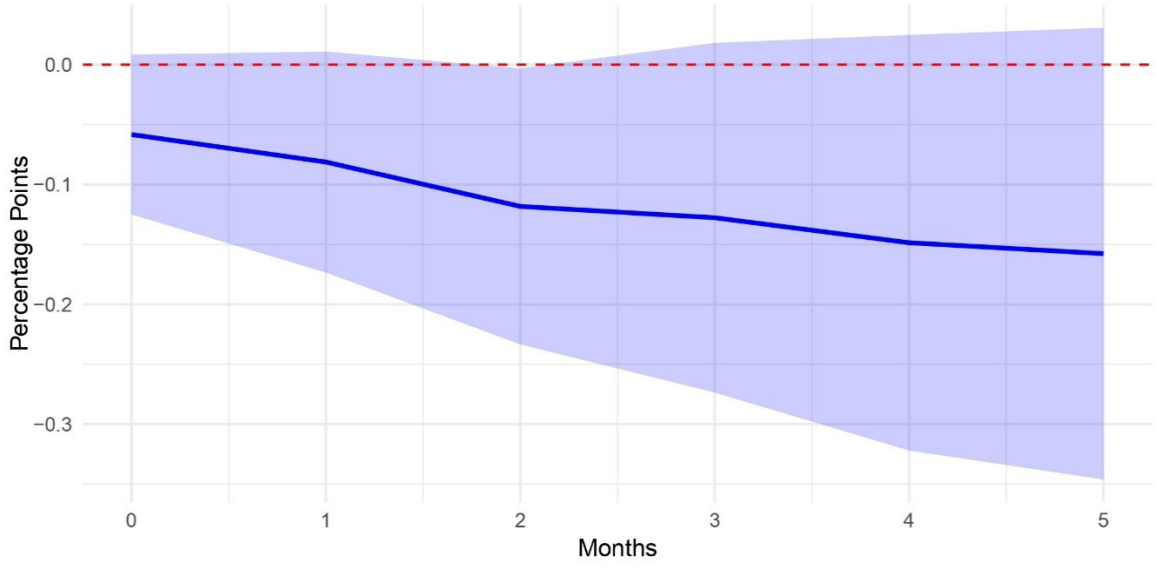


Figure 9: Impulse response function of Repo rate measuring the impact of climate risk on policy rate. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

However, it is possible that the central bank might deploy non-rate tools, such as liquidity, to respond to the climate shocks. There are two possibilities in this regard. If the inflationary effects of the climate shocks outweigh its contractionary effects, then we might see a liquidity tightening. Whereas, if the economic losses stemmed from the climate shock because of property damages, livelihood losses, etc., are the main concerns, then we might expect money supply growth to be higher.

Figure 10 shows the effect of an increase in the climate risk index on the growth of the money supply for different horizons. The measure of money supply taken here is M3, which is in line

with various existing literature (e.g. see Sharma and Nurudeen,2019). M3, also known as broad money, is a measure of the total money supply within an economy. It includes currency in circulation, demand deposits, time deposits, and other liquid assets like money market funds and repurchase agreements. M3 is broader than M1 and M2, encompassing more forms of money and is a better measure of the overall liquidity and financial condition of the economy.

The impulse response plot shows an initial rise in money supply growth up-to 1.1 percentage points before declining and wearing off around the 4th month after the climate shock. This positive effect could be due to several factors. (i) When climate shocks lead to output losses and contraction in the economy, the RBI might infuse liquidity to stimulate the economy (ii) Climate shocks might affect farmer productivity negatively and exacerbate credit risk in agriculture and related sectors, prompting RBI to infuse more liquidity to prevent monetary tightening and maintain financial stability (iii) Unlike policy rates, liquidity adjustments offer more flexible and immediate solution to economic stress considering the inflation trade off. This is in line with the report by the International Monetary Fund (IMF) and the Société Universitaire Européenne de Recherches Financières (SUERF) that non-interest rate tools are often preferred to resolve financial stress over policy rate manipulation (SUERF,2025).

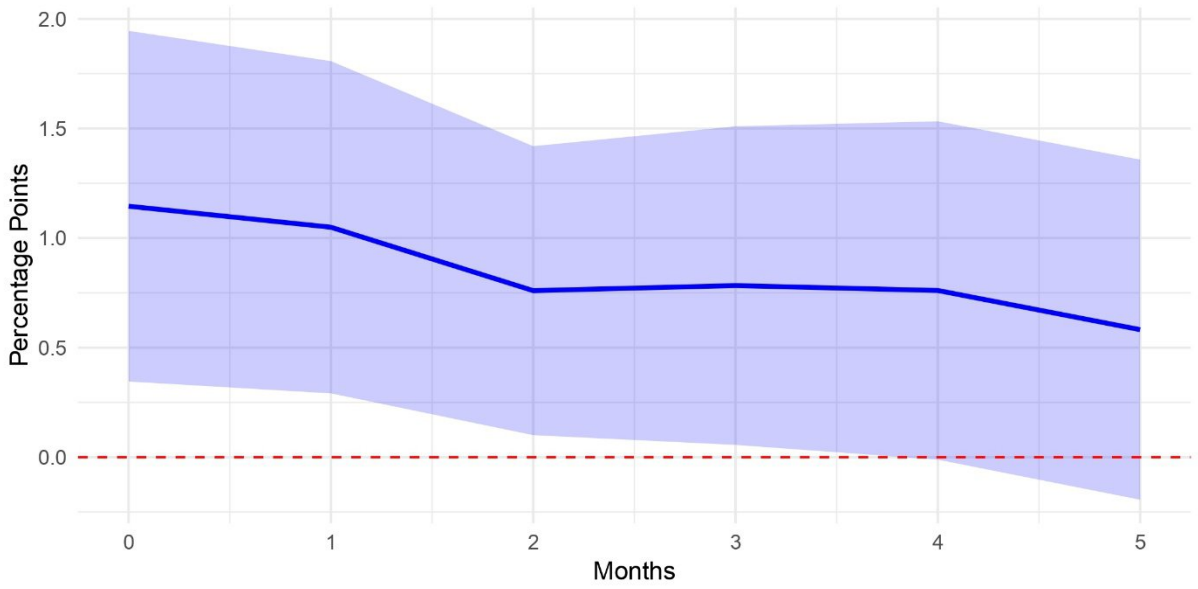


Figure 10: Impulse response function of money supply growth. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

5. Robustness Check

5.1. WPI inflation as an inflation measure

Figure 11 presents the local projection results when Wholesale Price Index (WPI) inflation is taken instead of CPI. WPI or the Wholesale Price Index is the price index that captures the price of goods sold by wholesalers across India. It is different from CPI in many aspects. CPI considers final prices including taxes and subsidies, whereas WPI considers only wholesale prices. Also, WPI does not take into account service-based consumption.

From the plot, we see that WPI inflation also exhibits a positive effect due to climate risk. But the effect is statistically significant for only a shorter period of time. However, as the effect on WPI peaks earlier as compared to CPI inflation it can be used as an early signal of climate-induced inflation.

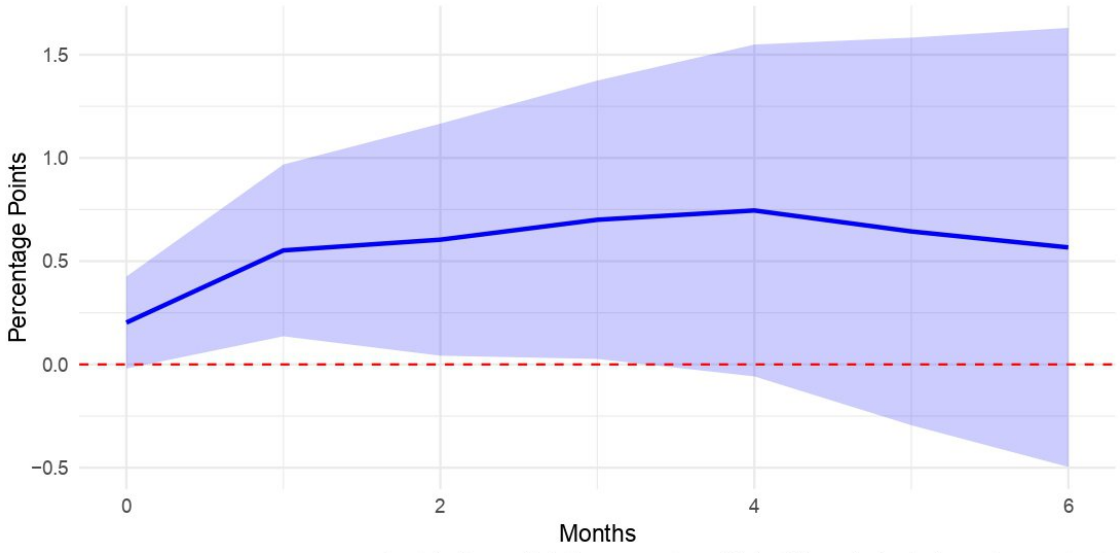


Figure 11: Impulse response function of WPI inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

5.2. Alternative Measure of Climate Index

Following Ahmad et al.(2024), we scanned various climate glossaries and hazard indices, and curated a list of 50 keywords and phrases related to Physical risk. Using the same relative headlines frequency method, we built a physical risk index for India for the period 2001-2022. Figure 12 shows the impulse response function of CPI inflation to changes in the physical risk index. From the local projection plot, we see that the effect of the alternative index containing only physical risk is statistically insignificant on CPI inflation. On further analysis, the same is observed for different components of CPI inflation as well. Some possible explanations could be (i) Physical risk events like floods and droughts are sporadic and localised. It is possible that the national newspaper does not cover all the physical climate events throughout the country, leading to an inaccurate country-level physical risk index (ii). Climate disasters like cyclones and floods might not be affecting macroeconomic variables unless they are large-scale disasters. So, the keyword frequency-based index might fail to capture the intensity of the disasters and their economic significance (iii). Literature suggests that physical climate

events have largely localised and sector-specific effects in terms of economic implications (Panwar and Sen, 2019), and country-wide effects might be muted.

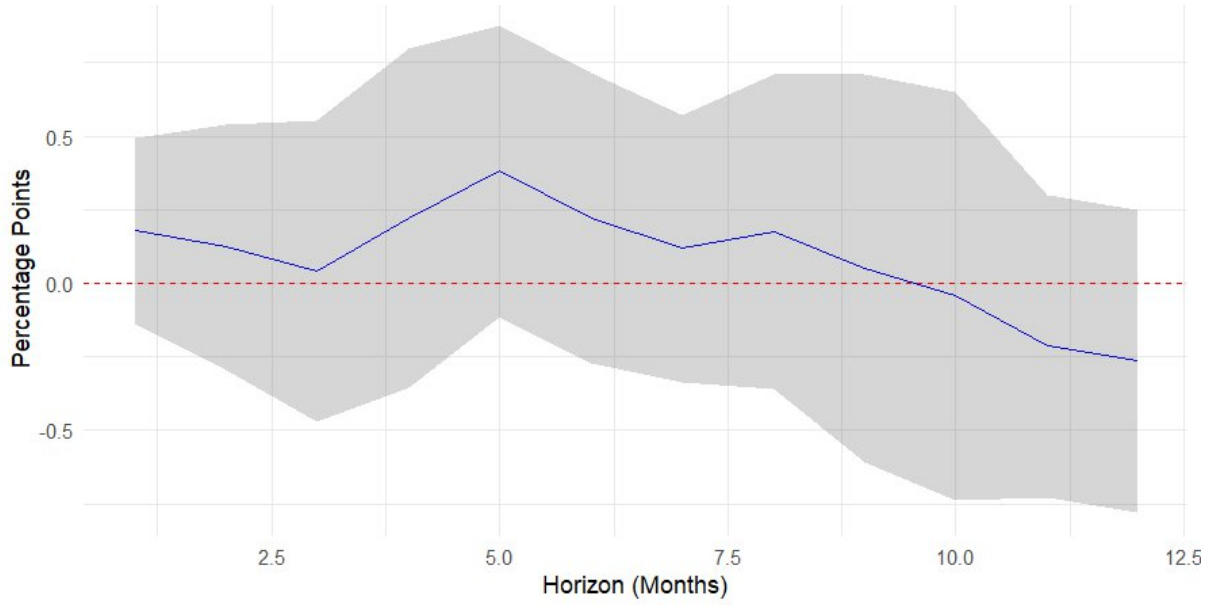


Figure 12: Local Projection: Impact of Physical Risk Index on inflation. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

5.3.Excluding post-COVID data

Multiple studies have identified the COVID pandemic as the structural break in macroeconomic data, calling for the need to de-COVID the data (Ng, 2021; Harding et al., 2023). Most macroeconomic measures during and post-COVID are found to be biased due to consumption anomalies and survey disruptions. Thus, it is wise to exclude post-COVID data from our analysis and see if the results still hold. For this, we consider data up to February 2020, after which COVID-19 became widespread throughout the world.

Figures 13 and 14 present the local projection plots on CPI inflation and repo rate, respectively, after excluding the post-pandemic data. From Figure 13, we see that the effect on inflation is significant for a long time, up to around the 17th month after the climate shock. This points to

a long-term climate-induced inflationary pressure in the presence of normal economic conditions. On the other hand, excluding post-COVID data shows that climate shock had a lagged but significant and negative effect on the policy rate set by the RBI. This indicates that the RBI treats the inflationary effects of climate risk as transitory but acts with policy rates when there are contractionary effects of climate stress on the overall economy. This is also in line with the earlier finding of the central bank's accommodative stance through liquidity infusion.

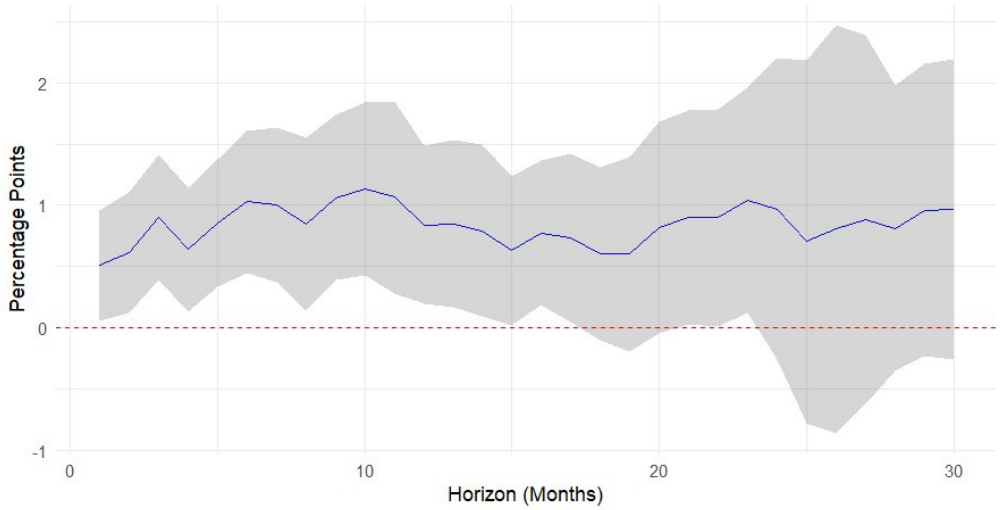


Figure 13: Local Projection on inflation excluding post-COVID data. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

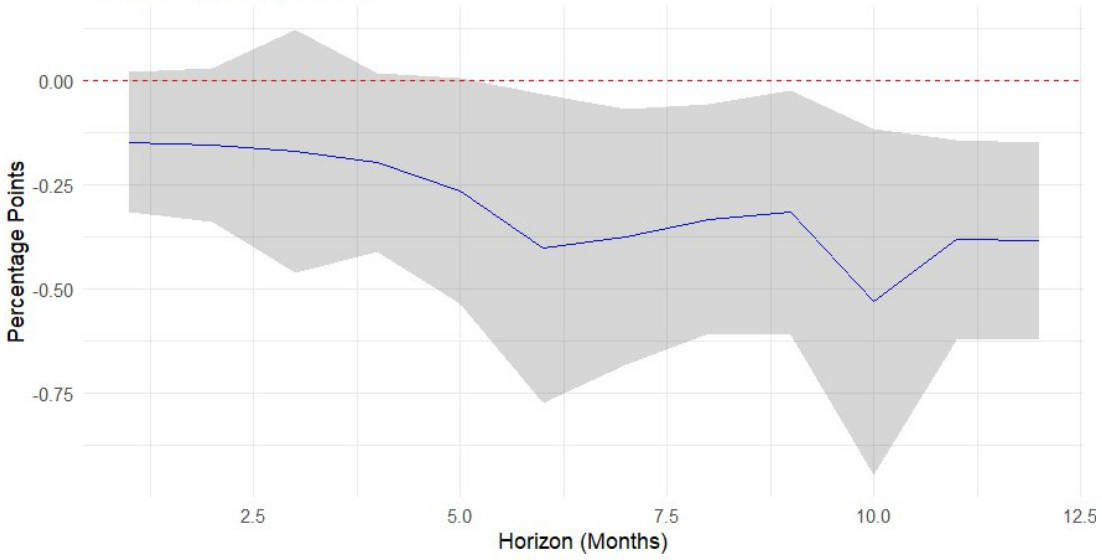


Figure 14: Local projection on repo rate excluding post-COVID data. Notes: Solid blue line represents impulse response of a one-unit climate risk index. The shaded area represents 95% confidence band.

6. Conclusion

This paper used news headlines data from 2001 to 2022 to build a novel climate risk index for India, and dives deep into the dynamics of inflation and climate risk. Employing the local projection method, this study reaches the following conclusions: climate risk heightens headline inflation, and the effect persists for several months. The effect remains positive and significant in cases of both CPI inflation and WPI inflation. Further analysis suggests that the effect on inflation is largely due to supply-side pressure exacerbating food inflation and, to some extent, energy inflation. The effect on energy inflation is immediate and short-lived, whereas the effect on food inflation is lagged and persistent for a long period of time. Core inflation remains unaffected by climate risk. Demography-based comparisons show that rural inflation, having a higher share of food components, is affected more and for a longer period than urban inflation. Although the RBI does not respond to climate shocks with policy rate changes, evidence suggests of liquidity infusion in the economy. This may point to the RBI's stance of using non-interest rate tools to contain climate shocks and ensure financial stability. However, after excluding the post-COVID data, we see that the repo rate is negatively affected by climate risk, suggesting that under normal economic conditions, the RBI is more concerned with the impact of climate risk on economic growth rather than the inflationary pressures. The research findings have policy implications both for the central banks and the fiscal authorities. Central banks need to strike a fine balance between the growth concerns and inflation concerns due to climate risk. They can also explore climate risk-based forecasting models to estimate future inflation dynamics and act accordingly. We found out that food inflation and, hence, rural inflation is more affected by climate shocks as compared to urban inflation. This calls for

better infrastructure planning in the rural areas to support the agricultural sector and the food supply chain ecosystem.

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