

Inflation Expectation and Cryptocurrency Investment

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2025 ABFER

Motivation

Where do demands for cryptocurrencies come from?

- A fundamental question in cryptocurrency research
 - ▶ help appreciate how cryptocurrencies accrue values
- A myriad of possible explanations from the literature
 - ▶ financing illicit activities (Foley et al. (2019), Li et al. (2021), etc.)
 - ▶ bypassing capital controls (Makarov and Schoar (2020), Yu and Zhang (2022), etc.)
 - ▶ ensuring financial freedom (Choi et al. (2022), Pagnotta (2022), etc.),
 - ▶ supporting platforms (Cong et al. (2021), Li and Mann (2025), etc.).
- Cryptocurrencies as inflation hedges?
 - ▶ arguably one of the most oft-advocated advantages of cryptocurrencies
 - ▶ yet little theory or empirical evidence

Challenges

Lack of granular individual-level data on cryptocurrency investment

- investor-level data on off-chain exchanges are not public
- on-chain trading does not reflect fiat fund flows
- naive corr. b/w crypto returns and inflation exp. render mixed results

Ambiguous *ex ante* theory: substitution or precautionary savings?

Need *direct* evidence to answer:

- Do households *really* regard crypto investment as inflation hedges?
 - ▶ How much does inflation expectation drive crypto investment?
 - ▶ What cryptocurrency do households view as inflation hedges?
 - ▶ Does the result differ across demographic groups?
 - ▶ What about emerging economies given cryptos being global assets?

How we address the challenges

- Proprietary trading data
 - ▶ from the dominant crypto exchange in India
- matched with granular household inflation expectation
 - ▶ from surveys run by the Reserve Bank of India

Main findings

- 1% increase in one-year ahead inflation expectation is associated with
 - ▶ about ₹1,000 more net crypto purchase per investor the next period
- Extensive margin on new customers as well
- heterogeneous effects across assets
 - ▶ significant for Bitcoin — first/largest cryptocurrency with a fixed supply
 - ▶ significant for Tether (USDT) — stablecoin pegged to the US dollar
 - ▶ insignificant for other cryptocurrencies
- heterogeneous effects across geography/time
- no significant difference across demography (among crypto investors)
 - ▶ although men tend to have lower inflation expectations than women;
 - ▶ young people tend to have lower inflation expectations than old people
 - ▶ within the whole population
- causal interpretations
 - ▶ current inflation as IV for inflation expectation ([Weber et al., 2023](#))

Why India?

Significant position in the global cryptocurrency landscape

- No.1 in [Chainalysis 2023 Global Crypto Adoption Index](#)
- No.1 in population ([median age 28](#))

Plagued by high inflation historically

- average inflation rate 6.32% over the past decade
 - ▶ peaking at 10.91% in 2013 and bottoming at 3.59% in 2017

Difficult to hedge inflation via fiat currencies.

- strict capital controls under Foreign Exchange Management Act (FEMA) managed by the Reserve Bank of India (RBI)

United States Dollar to Indian Rupee

83.4501 ↑ 165.64% +52.0351 MAX

Oct 4, 11:00:56 PM UTC • Disclaimer



► INR's Inflation Rate, Exchange Rate, and Differences

Data

Largest Indian cryptocurrency exchange

- proprietary trading data from January 2018 to June 2022
 - ▶ trading pair (e.g., BTC/INR), timestamp, price, quantity, investor IDs
- demographic attributes of each investor ID
 - ▶ age, gender, city, country, pincode, date of joining, etc.

Inflation Expectation Survey of Households (IESH)

- “bi-monthly” since Nov. 2006 by Reserve Bank of India, covering:
- survey period, city, pincode, gender, age group, job category
- view on current / 3 months ahead / 1 year ahead inflation rate
 - ▶ rate buckets (e.g., 1%-2% or actual input above 16%)

Match by pincode and period and calculate

- average inflation expectations in each match
- subsequent-period volume of each Investor_ID/trading pair/period

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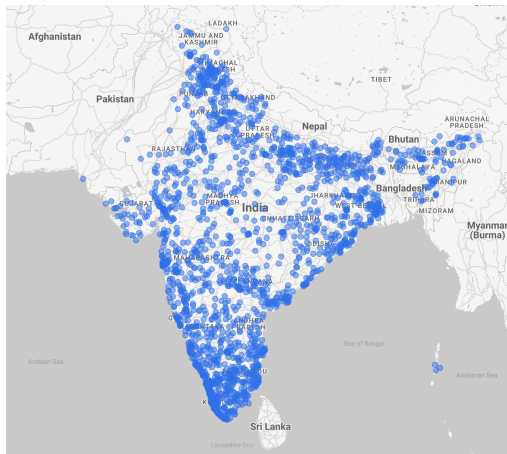
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Crypto investor demographics

Crypto investors:

- median age: 31
- gender composition:
 - ▶ male: 83.66%
 - ▶ female: 11.71%
 - ▶ undisclosed: 4.63%
- Representative pincode distribution
- Average inflation Expectation 14%, higher than national average



Empirical specification

Fama-MacBeth regression (investor i and survey period t)

$$\text{net_inr_buy}_{i,t+1} = \alpha + \beta \times \text{infl_exp}_{i,t} + \gamma \times \text{age}_{i,t} + \lambda \times \text{male}_{i,t} + \epsilon_{i,t+1}$$

- extract cross-sectional relationship between households'
 - ▶ inflation expectations
 - ▶ net cryptocurrency purchase amounts
- large cross-section of investors each with infrequent trades over time
- not require each individual to have multiple time-series observations
- enables estimating time-varying coefficients

Establishing causality

- Perceived current inflation as inflation expectation instrument variable
- Weber et al. (2023)

Crypto Purchase on Inflation Expectations

Dependent var: net_crypto_buy_inr_amt	(1)	(2)	(3)	(4)	(5)
current_inflation	1,112** (485.0)				
3_mo_infl_exp		819.3** (340.2)			
1_yr_infl_exp			998.5** (419.3)		
3_mo_infl_exp (instrumented)				965.0** (420.8)	
1_yr_infl_exp (instrumented)					1,069** (466.2)
age	354.9 (402.9)	352.9 (403.6)	347.8 (404.4)	352.2 (403.2)	351.1 (403.3)
gender	-20,080 (12,745)	-20,095 (12,726)	-20,043 (12,694)	-20,015 (12,727)	-19,973 (12,716)
Constant	-12,417 (22,633)	-10,285 (22,907)	-12,276 (22,079)	-12,770 (22,608)	-14,117 (22,524)
Obs.	652,168	652,164	652,152	652,168	652,168
R ²	0.005	0.005	0.005	0.005	0.005
Groups	26	26	26	26	26

Placebo Tests

Crypto Purchases with USDT as Base Currency

Dependent var: net_crypto_buy_inr_amt	(1)	(2)	(3)	(4)	(5)
current_inflation	-247.9 (235.4)				
three_months_inflation		-257.3 (224.0)			
one_year_inflation			-231.6 (225.0)		
three_months_inflation_hat				-215.1 (204.2)	
one_year_inflation_hat					-238.3 (226.2)
age	-114.1 (119.8)	-115.4 (119.5)	-118.8 (119.3)	-113.5 (119.4)	-113.2 (119.3)
gender_index	3,453 (2,405)	3,418 (2,392)	3,315 (2,371)	3,439 (2,403)	3,429 (2,401)
Constant	6,761 (6,524)	7,122 (6,701)	7,036 (6,803)	6,839 (6,585)	7,139 (6,821)
Observations	652,168	652,164	652,152	652,168	652,168
R-squared	0.001	0.001	0.001	0.001	0.001
Number of groups	26	26	26	26	26

Placebo Tests

Crypto Purchases with BTC as Base Currency

Dependent var: net_crypto_buy_inr_amt	(1)	(2)	(3)	(4)	(5)
current_inflation	-128.0 (109.1)				
three_months_inflation		-119.3 (99.49)			
one_year_inflation			-101.9 (81.71)		
three_months_inflation_hat				-111.0 (94.65)	
one_year_inflation_hat					-123.0 (104.9)
age	101.7 (68.10)	102.8 (68.40)	101.6 (67.68)	102.0 (68.15)	102.1 (68.17)
gender_index	5,953** (2,603)	5,950** (2,607)	5,875** (2,590)	5,946** (2,601)	5,941** (2,599)
Constant	-6,130 (3,911)	-6,095 (3,865)	-6,182 (3,944)	-6,090 (3,909)	-5,935 (3,903)
Observations	652,168	652,164	652,152	652,168	652,168
R-squared	0.003	0.003	0.002	0.003	0.003
Number of groups	26	26	26	26	26

Inflation Expectations and New Customer Acquisition

	Dependent Variable: New_Customer				
	(1)	(2)	(3)	(4)	(5)
Current Inflation	1.149*** (0.178)				
Three Months Inflation		1.190*** (0.173)			
One Year Inflation			1.037*** (0.150)		
Three Months Inflation Fitted				1.145*** (0.178)	
One Year Inflation Fitted					1.106*** (0.172)
Number of Survey Respondents	0.611*** (0.187)	0.635*** (0.187)	0.603*** (0.187)	0.611*** (0.187)	0.610*** (0.187)
Proportion of Self Employed	20.18*** (6.536)	19.75*** (6.518)	20.19*** (6.523)	19.87*** (6.534)	20.76*** (6.541)
Constant	13.17*** (4.249)	10.27** (4.417)	12.79*** (4.308)	11.72*** (4.397)	11.00** (4.474)
Observations	7,735	7,733	7,733	7,735	7,735
R-squared	0.008	0.011	0.010	0.008	0.008
Number of pincode_index	945	944	945	945	945

Heterogeneity across cryptocurrencies

Base Currency	INR		USDT		BTC	
	Coefficient	Std.err	Coefficient	Std.err	Coefficient	Std.err
USDT	818.6*	(411.4)	-	-	-	-
BTC	383.7**	(173.1)	-171.1	(188.7)	-	-
XRP	-16.23	(27.29)	-69.47*	(35.25)	-11.34	(29.58)
DOGE	-5.054	(8.196)	1.264*	(0.725)	-	-
SHIB	1.186	(2.247)	0.858	(0.710)	-	-
WIN	-0.366	(0.825)	0.688	(0.688)	-	-
TRX	-29.61	(30.24)	21.19	(18.57)	-14.04	(18.85)
ETH	-56.61	(34.94)	-66.36	(62.44)	-36.25	(21.92)
BTT	-10.02**	(4.580)	5.444	(3.653)	-17.26	(18.26)
ADA	1.232	(2.337)	-5.127**	(2.453)	1.913	(4.819)
MATIC	-3.469	(6.445)	0.628	(2.580)	-10.42	(9.643)
WRX	-20.64	(16.29)	15.38	(11.27)	9.310	(17.34)
BNB	-2.797	(2.540)	2.378	(2.489)	-2.036	(3.206)

Geographic Heterogeneity

VARIABLES	Dependent Variable: INR_Amount_Net				
	(1)	(2)	(3)	(4)	(5)
One Year Inflation	1,038** (429.7)	2,629* (1,355)	1,030** (427.4)		
One Year Inflation (IV)				2,658* (1,331)	1,107** (476.1)
Age	341.1 (414.2)	332.9 (415.8)	341.9 (414.0)	336.1 (414.2)	347.2 (412.0)
Male	-20,347 (12,886)		-20,336 (12,885)		-20,245 (12,896)
Semi_Urban	15,863*** (4,837)	15,799*** (4,769)		16,664*** (5,322)	
Rural	2,773 (2,902)	2,816 (2,909)		3,258 (2,917)	
Inflation*Male		-1,835 (1,123)			
Inflation*Semi_Urban			1,046*** (368.6)		
Inflation Fitted*Male				-1,783 (1,063)	
Inflation Fitted*Semi_Urban					1,242*** (419.9)
Constant	-12,750 (22,535)	-30,067* (15,263)	-12,564 (22,514)	-31,866* (15,786)	-14,598 (22,890)
Observations	638,818	638,818	638,818	638,834	638,834
R-squared	0.006	0.006	0.006	0.006	0.005
Number of groups	26	26	26	26	26

Expected Return from Independent Survey

	Dependent Variable: INR_Amount_Net				
	(1)	(2)	(3)	(4)	(5)
Current Inflation	2,089** (813.2)				
Three Months Inflation		1,403** (683.6)			
One Year Inflation			1,604* (827.4)		
Three Months Inflation_hat				1,741** (677.6)	
One Year Inflation_hat					2,055** (800.1)
Expected Return	0.00428* (0.00219)	0.00430* (0.00227)	0.00471* (0.00240)	0.00453** (0.00226)	0.00509** (0.00242)
Annual Income ($\text{₹}5-7.5 \times 10^5$)	43,021* (22,250)	42,338* (22,145)	41,251* (21,759)	42,593* (22,131)	41,243* (21,762)
Annual Income ($\text{₹}7.5-10 \times 10^5$)	-16,428 (28,776)	-16,249 (28,858)	-16,431 (28,770)	-16,825 (28,840)	-17,155 (28,894)
Annual Income ($\text{₹}10-50 \times 10^5$)	15,009 (18,494)	14,666 (18,537)	15,132 (18,621)	14,820 (18,470)	15,443 (18,550)
Annual Income ($> \text{₹}50 \times 10^5$)	-19,920 (27,386)	-20,727 (27,632)	-20,286 (27,885)	-19,077 (27,467)	-18,233 (27,552)
Age	-2,671** (1,356)	-2,698** (1,363)	-2,717** (1,370)	-2,700** (1,362)	-2,725** (1,367)
Male	11,691 (13,659)	10,365 (13,641)	9,870 (13,698)	10,839 (13,687)	10,285 (13,709)
Constant	33,048 (37,969)	41,181 (37,958)	39,516 (38,972)	34,690 (38,119)	31,456 (37,832)
Observations	681	681	681	681	681
R-squared	0.025	0.024	0.025	0.025	0.025

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First-stage IV Regressions

	(1) 3_mo_infl_exp	(2) 1_yr_infl_exp
current_inflation	1.153*** (0.000544)	1.040*** (0.000890)
age	0.00277*** (0.000438)	0.00351*** (0.000717)
gender	-0.0666*** (0.00976)	-0.100*** (0.0160)
Constant	0.366*** (0.0188)	1.590*** (0.0308)
Obs.	652,164	652,152
R ²	0.873	0.677

INR's Inflation Rate, Exchange Rate, and Differences

Year	Infl. Rate (%)	FX (USD/INR)	FX Change (%)	Diff. (%)
2011	8.87	46.67	-	-
2012	9.30	53.44	14.51	-5.21
2013	10.91	58.60	9.66	1.25
2014	6.37	61.03	4.15	2.22
2015	5.87	64.15	5.11	0.76
2016	4.94	67.19	4.74	0.20
2017	3.59	64.46	-4.06	7.65
2018	4.86	69.92	8.47	-3.61
2019	4.51	70.39	0.67	3.84
2020	6.20	74.84	6.32	-0.12
2021	4.91	73.49	-1.80	6.71
2022	6.70	82.75	12.60	-5.90
2023	5.70	83.25	0.60	5.10
Avg.	6.36	66.94	5.08	1.07