

Can Cryptocurrency Tap the Indian Market? Role of having Robust Monetary and Fiscal Policies

[¹] Biswajit Palit, [²] Sakya Mukherjee

[¹] Jadavpur University, West Bengal, India

*Corresponding author. Email: [¹] biswajitpalit23.08.01@gmail.com

Abstract— The growing debate and discussions about legalizing digital currency- raises a significant question does the market have the withstanding power to include people from all segments of society for its usage. In such a nexus, India, when compared to its Asian counterparts is endowed with a booming crypto industry. However, due to many macro-economic and regulatory reasons which come parallel with the crypto trade, the Government of India is taking cognizance of regulating and rationing cryptocurrency trade. Cryptocurrency not only has prospects but at the very moment is enveloped with lots of apprehensions. Countries around the world are using blockchain technology to manoeuvre their development, coupled with swift payment modus operandi, low transaction fees absence of a mediator during transactions make the brighter side of this rapid digital currency. At the same time, unlike other currencies, cryptos are famously detached from any central banks or financial institutions and thereby received a completely decentralized status. On one side, this can free the investors from being beholden by the institution but on the flip side, there arise legal complications. Exposure to too much volatility and severe cases of fraudulent activities are prone to make investors apprehensive of this practice. We find, having a robust financial inclusion system, backed by proper monetary and fiscal policies is one of the necessary conditions to ensure that cryptocurrency taps the Indian market. By dissecting market phases into Accumulation, Pure Buy, Distribution and Pure Sell, we employ Robust Regression to test our proposition. Therefore, for crypto to finely blend in the Indian market and cause endogenous growth, the financial backbone of the economy needs to have a tremendous withstanding potential which comes when the country has vigorous financial inclusions and institutions.

Index Terms— Cryptocurrency, Regulatory Measures, Financial Inclusion

I. INTRODUCTION

At the very outset, it is important to note that cryptocurrency has been an extremely up-and-coming market. But not much research has been done in the fields of its viability in terms of a sustainable mode of payment, a regular legal tender. After El Salvador legalized cryptocurrency, the interest in this decentralized network has grown substantially grown. The importance of financial inclusion and a robust product and money market model is something that has yet to be studied.[11]

In Budget 2022, the Honourable Finance Minister of India proposed taxation of income from virtual digital assets at the rate of 30%. On the contrary, she proposed the introduction of Central Bank regulated digital currency. It is interesting to note that with reforms suggesting an increase in net exports, via an increase in import duties, an imminent appreciation in the exchange rate can be noted. This would lead to a reduction in the foreign currency inflow in the subsequent periods. As a result, investment in the crypto market is expected to fall. Assuming the above reforms are an attempt to shift from a risky crypto market to a government-regulated digital currency, the prospects demand to be viewed from a neutral perspective in terms of financial inclusion and promotion of digitization in India.

This paper aims to study the impact of the inclusion of a risky digital market in the economy and analyze the effect on interest rates and investments and overall GDP.

II. LIMITATION

Since the actual model of introduction of digital currency has not been announced by the Central Bank or the Finance Ministry yet, this paper considers the cryptocurrency market for its study.

The Reserve Bank of India banned cryptocurrency transactions in 2018, as a result, the last transactions that were found were on January 8th. 2019. So the study deals with data from 18th August 2013 to the abovementioned date only.[2][10]

III. LITERATURE REVIEW

Cryptocurrency is based on cryptography, which provides many advantages over traditional payment methods (such as Visa and MasterCard) including high liquidity, lower transaction costs, and increased anonymity (Abraham.M,2019).[6] Apart from that, there are a lot of positive aspects of cryptocurrency that can be highlighted. The two main advantages of cryptography are to ensure that only an appropriate “address holder” can “spend” the funds attributed to an address, and people cannot fraudulently tamper with their cryptocurrency balances.

“To define Cryptocurrency as a currency is very complicated” – (Limba.T. et al, 2019, pp 2069 – 2075). While there are positive facets to cryptocurrencies like the ease of transaction and elimination of intermediaries, cryptocurrency has **disruptive technology**. However, the analyses of bitcoins in Baltic countries by the authors reveal

that the boundary between cryptocurrency and virtual money is **unclear**. Moreover, it can bring additional risks such as tax evasion, **fraud activity** or virtual currency, which can be used in the shadow economy.[14]

Bitcoin and cryptocurrencies also raise several important ethical issues. These include concerns that the anonymity endowed by cryptocurrencies may encourage illegal activities, cybersecurity worries, and fears over the continued ability of governments to raise taxes. In the backdrop of these ethical issues and several legal risks, (*Fry. J & Cheah. E.T, 2019*) observe the movements of two major cryptocurrency markets Bitcoin and Ripple. They find "*Evidence for a negative bubble is found from 2014 onwards in the two largest cryptocurrency markets Bitcoin and Ripple. Further, evidence suggests that there is a spill-over from Ripple (XRP) to Bitcoin that exacerbates recent price falls in Bitcoin.*" This makes it important to study the negative bubble and predict probable causes of the phenomenon.[3][9]

Cryptocurrencies could be considered as a hedging asset in the normal scenarios but a perfect diversifier during downturns or periods of high uncertainty since public companies and fiat currencies are strictly connected with the state of the economy (Jorcano. L & Benito.S, 2020) The reason behind this is the disruptive nature of the crypto token as compared to the fiat tokens. (*Tomās. DV et.al, 2020*) uses the Wavelet approach and the Markov Switch model to analyze the co-movement of the stock market indices and the Bitcoin exchange in time series values in the time of the Covid 19 pandemic when the markets showed a significant downturn. In an attempt to understand whether the cryptocurrency market can be used as a diversifier to a downturn in the stock indices, the authors found that "**cryptocurrencies do not reduce financial risk.**"[8][12]

Cryptocurrency has erratically grown since the inception of the first Bitcoin in 2009. Blockchain technology has much to analyze, among them movement and volatility is the most important factor.[7] In an attempt to analyze the movement of the market based on impacting factors like **media settings and propaganda** (*Aggarwal. G et al., 2019*). They concluded that "*the correlation between the social factors and the market trends does not seem to hold a strong significance i.e there exists no strong correlation between the social factors and the market trends.*"[16]

The decentralized nature of digital currency Bitcoin—and its underlying “blockchain” technology—has created much excitement in the technology community, but its potential for building truly empowering social and solidarity-based finance has yet to be tested. The question of whether Bitcoin can be harnessed to empower marginalized communities and build new means of solidarity-based finance remains unanswered. (*Scott. B (2016)[1], UNRISD, Geneva pp 1-20*) raises the issue of penetration of Bitcoin tokens in the marginalized sectors of society. "**Escaping weak local institutions might help individual people but does little to empower the broader social majority who remain reliant on**

the existing systems. Those who are most likely to seek escape are, perhaps, social elites with high education, access to technology, and capital to protect." The paper suggests how an advanced "**Blockchain 2.0**" technology has the potential for market percolation despite the risks associated with it.[18]

The advent of cryptocurrency demands a robust financial inclusion model to penetrate the market at a large scale. In recent years, the increased adoption of cryptocurrency, mobile phones, and the internet has generated much speculation and optimism concerning its effects on financial inclusion and financial sector development. (*Vincent. O et.al, 2019*) constructed a linear regression model with the dependent variable being a composite index of financial sector development and independent variables being the price of bitcoins (BTC), mobile cellular subscriptions, number of internet users, and macroeconomic factors such as GDP. The empirical work suggests a significant positive correlation between the financial sector development and usage of cryptocurrency. The study also reflects "*cryptocurrency, internet usage, and mobile subscriptions cause financial inclusion and financial sector*".[21]

Financial inclusion is an innovative concept that makes alternative techniques to promote the banking habits of the rural people because India is considered as the largest population for rural people consist in the world. Another major problem is the digital divide in terms of internet penetration in the rural sector, which prevents the advent of crypto transactions in these areas. Financial inclusion is aimed at providing banking and financial services to all people in a fair, transparent, and equitable manner at an affordable cost. Households with low income often lack access to bank accounts and have to spend time and money for multiple visits to avail themselves of the banking services, be it opening a savings bank account or availing a loan, these families find it more difficult to save and to plan financially for the future. (*Ganeshkumar. V et.al (2013)* conclude that literacy and investment awareness is the key to instilling financial inclusion in society.[5]

The correlation between cryptocurrency and a country's exchange rate plays an important role in determining whether the country is ready to adopt crypto on a broader scale or not. (*Mallik. S et. al, 2021*) examine that there is a weak negative statistically significant correlation between USD YEN and BTC with a coefficient of -.142 between USD and BTC.[13]

Hence from the Literature review, we find that work has been done in the fields of financial inclusion and the advent of cryptocurrency in the world market on a large scale. Moreover, El Salvadorian President Bukele has been touting Bitcoin as a way for Salvadorans to reduce the fees they pay to send and receive remittances—which make up 22% of El Salvador's GDP, mostly from the U.S.—and as a way for the 70% of Salvadorans who are unbanked to access financial services. So much so that El Salvador became the first country to adopt Bitcoin as its legal tender. In such a scenario

it is important to analyze the sustainability of such a program in the long run and how can a country survive the large-scale requirements of funds to stabilize such a system.[15]

The work in this particular domain has focussed on isolating positive and negatives and at the same time looking into how the crypto trade is related to several macroeconomic factors. This paper aims to highlight two sides of the story, which will help to have a clear understanding of the prospects of digital currencies (which is cryptocurrency). The first part deals with if the country is suffering from a liquidity trap scenario then what can be done to pull the economy out from it and by doing so make the crypto market sustainable to perform better in the medium- to long term. Another side reflects in normal time how the volume of trade is related to exchange rate and the market conditions.

IV. METHODOLOGY

To understand the sustainability of cryptocurrency an IS-LM-BP model has been adopted with an added **risk factor** in terms of a cryptocurrency market. Since a change in the interest rate affects the money market as well as the product market, and at the same time creates pressure on the exchange rate, studying effects on both is essential to conclude about the prospects of this currency as a legal tender. A risk-averse investor is assumed in this scenario following the **mean-variance theorem** of investment. This implies that for a given amount of risk they will prefer a higher return and for a given amount of return they will prefer a lower risk.

India's daily local bitcoin price, the volume of trade, and INR to USD currency have been taken for 6 years from 2013 to 2019. A composite statistic analyzing the market phase has been developed by creating dummies for the four market phases have been constructed, namely, accumulation (1), pure buy (2), distribution (3), and pure sell (4). This has helped to understand how the volume of trade differs in each phase.[20]

Market Phase:	Volume	Price	Dummy
Accumulation	Low	Low	1
Pure Buy	High	High	2
Distribution	High	Low	3
Pure Sell	Low	High	4

A **Generalised linear regression** has been performed with the volume of trade as the dependent variable and INR to USD and Market Phases been explanatory variables. To correct the **autocorrelation** between the error term and the explanatory variables **Prais-Winstein Estimation** has been undertaken after finding Durbin Watson Statistic. GLS corrects the heteroscedasticity among the residual terms. By plotting the Kernal density estimate at bandwidth 2.06

against the normal density plot. To find the structural breakpoint in the dataset, a Markov switch was been employed.

Therefore. the true equation:

$$V = \alpha + \beta_1 E + (\alpha_2 - \alpha_1) D_2 + (\alpha_3 - \alpha_1) D_3 + (\alpha_4 - \alpha_1) D_4$$

Where V represents the Volume of bitcoins traded, E represents exchange rate (INR to USD- that is how many units of Indian rupee needs to be sacrificed to get an additional unit of USD) and Di represents the dummies of the market phases accordingly.

The following are the hypothesis that we are testing at a 95% confidence interval.

For Exchange Rate:	
Null Hypothesis: $H_0 : \beta_1 = 0$	There is no significant movement in the volume of trade when the exchange rate fluctuates.
Alternative Hypothesis: $H_a : \beta_1 \neq 0$	When the exchange rate appreciates or depreciates then the volume of cryptocurrency currency increase significantly.

For Market Phases:	
1: Accumulation: Null Hypothesis: $H_0 : \alpha_1 = 0$ Alternative Hypothesis: $H_a : \alpha_1 \neq 0$	1: When the market undergoes accumulation there is no significant effect on crypto's volume of trade. 2: When the market undergoes accumulation there is a significant effect on crypto's volume of trade.
2: Pure Buy: Null Hypothesis: $H_0 : \alpha_2 = 0$ Alternative Hypothesis: $H_a : \alpha_2 \neq 0$	1: When the market undergoes pure buy there is no significant effect on crypto's volume of trade. 2: When the market undergoes pure sell there is a significant effect on crypto's volume of trade.
3: Distribution: Null Hypothesis: $H_0 : \alpha_3 = 0$ Alternative Hypothesis: $H_a : \alpha_3 \neq 0$	1: When the market undergoes distribution there is no significant effect on crypto's volume of trade. 2: When the market undergoes distribution there is a significant effect on crypto's volume of trade.
4. Pure Sell: Null Hypothesis: $H_0 : \alpha_4 \neq 0$ Alternative Hypothesis:	1. When the market undergoes pure sell there is no significant effect on crypto's volume of trade. 2: When the market undergoes pure sell there is a significant

$H_a : \alpha_4 \neq 0$	effect on crypto's volume of trade.
-------------------------	-------------------------------------

Model:

Assumptions:

1. The market produces a single homogenous product. That is across the locations within the domestic territory however varying the quantity traded might be the quality of the product remains as it. Therefore, there doesn't arise any product differentiation.
 2. The product doesn't undergo any form of depreciation over time. Therefore, the return from the investment remains consistent across time dimensions.
 3. The economy is open. Therefore, the exchange rate will be a crucial ingredient to influence the volume of imports and the volume of exports.
 4. The price level is perfectly elastic (as of now). Any divergence in the product market output level gives the signal to the producers to expand or contract the output produced accordingly. That is to say. Therefore, when excess demand arises, the producer increases its output produced in the short run and that corrects the excess demand (ED).
 5. The investment is not only driven by animal instinct but at the same time is determined by the market prevailing rate of interest (r). Since the price level is perfectly elastic, there is no chance of inflation. Therefore, the real interest rate is equal to the nominal interest rate.
 6. There exists another form of the market other than the product which is the money market. In the money market, where the risk-free asset is the bond and cryptocurrency is the risky asset. Now, the households can either extend their savings by purchasing bonds or cryptocurrency and get a future income, while at the same time they can hold in the form of cash and yield no future income.
- This paper also assumes the investors to be risk-averse. As a result, they will give more priority to the risk-free market at first, and then the effect will ripple down to the risky market.
7. From the real money supply (M/P) which is an exogenous factor determined by the central bank of the country, it is utilized by the households to undertake their necessary consumption and investment expenditures. A part of it is transaction demand ($=kY$), where $k = (1/v)$ where v is the velocity of money. And the other parts are speculative demand for money in the bond market and speculative demand for money in the crypto market. So we see that money supply is utilized in three forms. 1. Transaction Demand, 2. Speculative demand in the bond market and 3. Speculative demand in the cryptocurrency market.
 8. We are operating under a flexible exchange rate regime and the assets are perfectly mobile.

Therefore, we see that there are two markets: the product and money markets. Both are interlinked between themselves and thereby need to be simultaneously solved. In the product market from an arbitrary rate of interest the output level is determined while in the money market from an arbitrary

output level equilibrium rate of interest is determined.

Now, from the literature, we find that the Government has no direct influence over the crypto market but any government policy creates a significant change in the operation of the crypto trade. Therefore, our objective is to integrate the influence of government role to shape the interlinkage between the product market and money market. Which is important in analyzing the suitability for adopting crypto in the long run.

We know from Keynesian macroeconomics is that the product market equilibrium can be elucidated by the equation:

$$S(Y_d) + T = I(r) + G + NX \quad \dots\dots(1)$$

$$\frac{\partial S}{\partial r} > 0 \quad \frac{\partial I}{\partial r} < 0$$

with the derivatives to be, $\frac{\partial S}{\partial r} > 0$ $\frac{\partial I}{\partial r} < 0$ and. And the stability condition is the **rate of change of savings wrt output should be greater than the rate of change of Investment wrt to output**.

While the money market equilibrium is guaranteed by the following equation:

$$MP = kY + L_2r + L_3(L_2)$$

$$\frac{\partial L_2}{\partial r} < 0, \frac{\partial L_3}{\partial L_2} < 0$$

The reason behind the first derivative is that the private investors which invest in the bond market will be inclined to buy more when the rate of interest is at its historically high value. At that time the price of a unit of bond is at its bedrock. Now, after meeting the transaction demand, holding money supply constant, they would like to invest the entire liquid cash available with them to buy the bond, with the anticipation that in the future the rate of interest will fall and prices shoot up and thereby they can generate a capital gain. Now, this happens till the point r belongs to its normal range which is between **rmin** and **rmax**. At r_{min} , the speculative demand for money is maximum since at that level prices are at their maximum. The investors believe in the future the rate of interest will rise and prices to fall and any buying at r_{min} would incur a capital loss. While converse holds when r is at maximum position. This makes the speculative demand for money have an inverse relationship with the market prevailing rate of interest.

It is assumed that the bond market is a risk-free market whereas the crypto market has a certain factor of risk involved in it. This gives ground for assuming that the relationship between the bond and the crypto market moves in the opposite direction. This means that when the price of the bond goes up the price of the cryptocurrency will fall. In such a case the speculative demand for bonds is high owing to the high price of bonds. When the price of cryptocurrency is low, the speculative demand for crypto will also be below. This means when the price of the bonds is high, the investors will hold their money instead of investing in the bond market, thus the speculative demand for bonds is high. Now according to the ISLM assumption of definitive speculation,

the mean-variance theorem of a risk-averse investor suggests that at the same amount of risk, an investor would prefer a higher return. As a result, the investors would go to invest in the crypto market where the prices are low and are definitively speculated to rise, instead of holding the money in hand. As a result, the speculative demand for the crypto market is low at this point. Hence the inverse relation is shown by the derivative. Here L3 denotes the speculative demand for money in the crypto market while L2 highlights the speculative demand for money in the bond market.

Conversely, when the price of bonds is low, the crypto prices will be high. The rational investors will now move from investing in the risky market, increasing its speculative demand, and go for investing in the bond market, thus decreasing the speculative demand for the risk-free security. Therefore, the speculative demand for cryptocurrency is inversely related to the speculative demand for bonds. This (L3) is seen as a function of speculative money demand in the bond market because the investors are risk-averse, so they give priority to risk-free security.

Therefore the money market equilibrium takes the form:

$M/P = kY + L_2(r) + L_3[L_2(r)]$; taking money supply and transaction demand to be fixed.

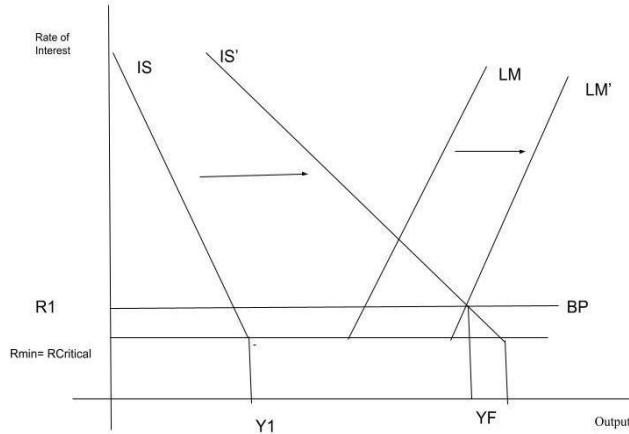
Assuming LM operates in the upward sloping region, let us consider a situation wherein there has been an exogenous rise in the money supply. The rise in the money supply, assuming fixed transaction demand, increases the amount available for speculation (we will take this case a bit later on). The rise in the money supply, causes the domestic rate of interest to fall short of the foreign interest rate. Now, since capital is perfectly mobile the situation of the Mundell Fleming Model holds. That will cause an enormous investment by the domestic investors in the foreign institutions (foreign bond market). Since the bond market is a risk-free market, the incentive to invest in the foreign bond market rises. Now, the rise in the net capital outflows, it will cause the exchange rate to depreciate. Due to the depreciation of the domestic currency, it will streamline the rise in net exports. Since now consuming the same unit of domestic goods by foreigners using foreign currency has been relatively cheaper. The rise in net exports will cause the total expenditure to rise, and thereby have a boom in the product market. That will garner in the rightward shift of the IS curve. As a result higher unit of output is produced. In the meantime, since the people have invested more in the bond market, the price of the bond rose while at the same time in the domestic market the price of the crypto has fallen causing the speculative demand for crypto to rise at an alarming rate. A rise in output, assuming constant transaction demand and consumption will again increase the amount available for speculation. Now, they would like to invest in the crypto market, as the price of crypto is relatively lower and the rate of interest is also lucrative. Thus we see, when the LM functions in the normal region, an exogenous rise in the Money supply, how it can induce investment in the crypto market. It all boils down to how the product market

reacts. This gives ground to discuss the role of Government and financial inclusion.

Now, it is customary for us to understand that at present moment, in the Indian economy as well as in the US economy. The rate of interest is very low. That is due to many macroeconomic factors. Some are to boost the market from the shock of covid-19. Having said that r is hovering close to its historically lower value. Therefore, it is reasonable to assume that the economy is presently approaching the liquidity trap.

Let us have the below scenario in the economy:

The economy was operating at the full employment level If, but due to some crisis period, the IS curve intersects the LM curve at the r_{min} level. Now, the Y_1 level of output is demanded aggregate. However, the producers continue to supply Y_F 's level of output. Now due to this excess supply that exists in the economy, the price level decreases. Due to the fall in the price, the real money supply increases. The rise in the real money supply causes the LM curve to shift left. But still, Y_1 units of output are demanded. This is a situation of liquidity trap that the economy experiences. The rise in the Money supply, assuming constant KY causes a rise in the amount available for speculation. But the private investors won't invest in the crypto market now since return from the crypto market is very low- indicated by r at min. Now, they hold the amount. This is a classical situation of a liquidity trap. Keynes suggests the problem can be overcome when the product market boom in general and AD rise in particular. This can happen if and only if Government expenditure rises. The rise in government expenditure will cause the IS curve to shift and If will be realized. Now we see that causes the rate of interest to go up and which translates to the price of the crypto has been relatively cheaper. Hence, investment in crypto takes place.



Source: Authors' formulation.

The major contribution of our paper lies here. How government can formulate the increase in government spending will be the deciding factor. We suggest, in this transition, if government enhances technology- then it will

augment the crypto market even more. At the same time array of financial inclusion measures such as access to financial institutions, minimizing the barriers to entry in the crypto market, boosting the sentiment of the investors by ensuring crypto is a safe heaven. All these will garner robust growth of the crypto market.

V. DATA ANALYSIS

The descriptive statistics of the variables taken are given in the below table:

stats	Volume	INRtoUSD	PriceB~R	CheatS~y
min	3.4153	58.46	8148.245	1
max	785.2463	74.4066	1228782	4
mean	100.8691	65.07475	166065.6	2.449974
p50	39.29629	64.8932	41087.03	2
skewness	1.703432	.3951433	1.724172	.2494603
kurtosis	5.597231	3.007515	5.485505	1.443215
cv	1.176033	.0479423	1.374732	.5015119
se(mean)	2.71503	.071405	5225.102	.0281216

The range the volume of cryptocurrency trade had in India had is tremendous as shown by the difference of maximum and minimum (which is around 782). About the volume of cryptocurrency trade (see figure 1), there was a significant structural break, at around **30th April 2017**. That means the budget 2017-18 which started to give huge impetus to the implementation of technology in transactions (such as by UPI, digital transaction, etc) played a vital role in mobilizing a significant upward trend in the volume of trade. The early quarters of FY 2018-19 saw a dip relatively in the volume of the crypto trade, which might be attributed to the onset of the economic shock. Overall post-2017 onwards, there has been a staunch upward trajectory in the volume of crypto trade and demonetization, and push by the government to facilitate tech-based transaction garnered it.[4]

(See Figure 3 & 4), the exchange rate (captured by INR to USD) was depreciating at a sluggish rate before 2017, but post that the rising trajectory has been quite adrift. Having said that from 11th August 2015 there was a structural breakpoint in the Indian forex market About the price of the cryptocurrency over time, we see the rise in the price was almost tallied with the growth of the volume of trade. The structural breakpoint was obtained around 12th October 2017. Before that, we can see how flattish and less the crypto price was. But two years almost after the demonetization policy, the price has been skyrocketing like anything (see figure b.2 of panel B).[17]

(Refer to figure 2): The movement in the market phases has been very interesting. Before the Demonistatisation policy, in and around Nov 2016, the crypto market experienced majorly accumulation and pure sell, with a bit here distribution, but very scant. But, post that period there has been a constant pure buy. Indicating private investors' sentiment to venture and invest in the crypto market has grown by leaps and bound.

The Spearman correlation matrix is given below:

	Volume	INRtoUSD	PriceB~R
Volume	1.0000		
INRtoUSD	0.1080*	1.0000	0.0000
PriceBTCINR	0.5958*	0.4323*	1.0000
	0.0000	0.0000	

Source: Authors' calculation. *-significant at 95%.

The matrix shows that the volume of cryptocurrency trade has a strong and significant positive causality with the exchange rate depreciation and price of the cryptocurrency (see Figures 5 & 6). This gives us in hindsight about our observation in section 1 of the data analysis was right, where we tried to investigate the relationship with help of a time series plot and complimenting with descriptive statistics.

To solidify, we run the Generalised Least squared regression and check the robustness of our model. The Prais Weinstein estimation solution is given below.

Cochrane-Orcutt AR(1) regression -- iterated estimates

Source	SS	df	MS	Number of obs	=	1,908
Model	1069414.53	4	267353.634	F(4, 1903)	=	89.68
Residual	5673288.3	1,903	2981.234	Prob > F	=	0.0000
Total	6742702.84	1,907	3535.76447	R-squared	=	0.1586
				Adj R-squared	=	0.1568
				Root MSE	=	54.601

Volume	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
INRtoUSD	6.184536	1.469808	4.21	0.000	3.301932 9.06714
CheatSheetDummy					
1	-.7750108	3.192125	-0.24	0.808	-7.035444 5.485422
2	134.3619	8.648345	15.54	0.000	117.4007 151.3231
3	98.28413	13.75634	7.14	0.000	71.30503 125.2632
_cons	-350.5721	94.70059	-3.70	0.000	-536.3 -164.8443
rho	.7131845				

Durbin-Watson statistic (original) 0.707658

Durbin-Watson statistic (transformed) 2.376099

Therefore, we find depreciation of the currency makes the volume of trade go up. To elucidate, a 1 unit rise in the exchange rate causes a significant 6.14 odd increase in the volume of trade. At the same time, pure buy (2) holds a significant relationship with the volume of trade. 1 unit rise in pure buy causes the volume of trade to rise by a significant 134 units. This justifies why post-2017 there was a huge rise in the volume of trade. As the product market boomed due to the rise in exchange rate facilitating exports and at the same time Government investment in technology and financial inclusion programs made the crypto market have a huge growth over the long term. The adjusted R squared value is around 60, which shows model can be explained well.

The regression equation can thus be written as:

$$\text{Volume} = -350.571 + 6.81 \text{ INRtoUSD} - 0.77$$

Accumulation + 134 Pure Buy + 98 Distribution

VI. CONCLUSION

The growth of cryptocurrency in India has been attributed primarily due to severe macroeconomic policies which makes technology at its fulcrum of operation. The cryptocurrency market has enormous potential to reap the benefits of trade and cause expounding economic growth. However, in all such dynamic transition processes, there needs to be an active role of government. The government needs to boost the financial inclusion drive by ensuring appropriate channels for credit linkage and minimizing the barriers to access the market. At the same time government needs to take the onus of curtailing the risk involved in the crypto trade and thereby create a holistic atmosphere for trading. When such robust action has been taken by the government, then only we can say the crypto market in general and digital currency, in particular, can act as a perfect substitute to the hard cash, and thereby harness lots of prospects.

Figures:

Note: All figures and derivation are the authors' calculations.

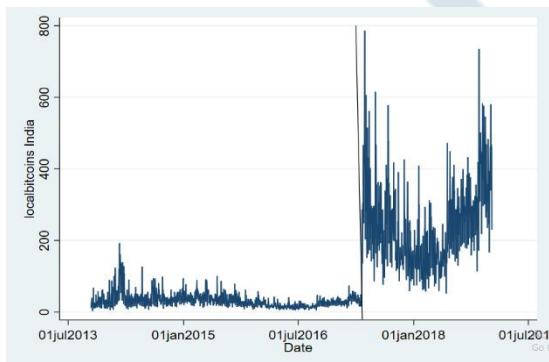


Figure 1: Volume of Trade Over Time

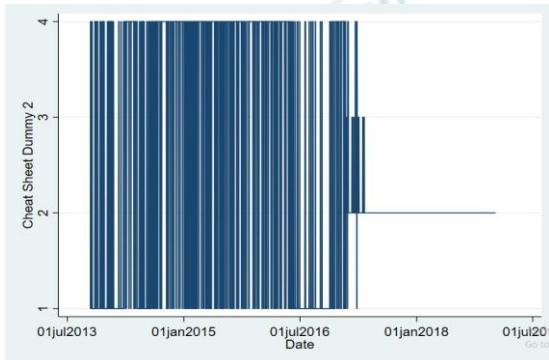


Figure 2: Market Phases over time



Figure 3: Exchange Rate over time

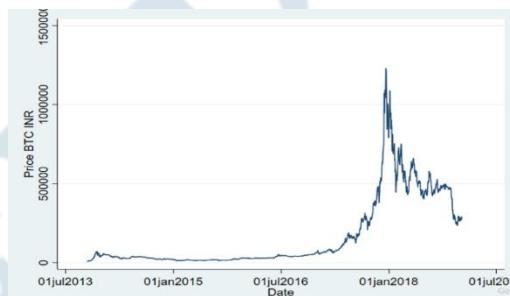


Figure 4: Price of Crypto Over Time

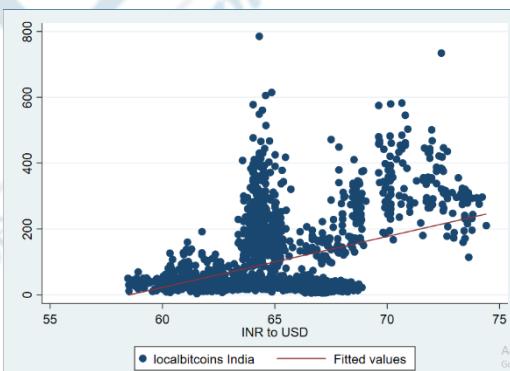


Figure 5: Volume of Trade vs Exchange Rate

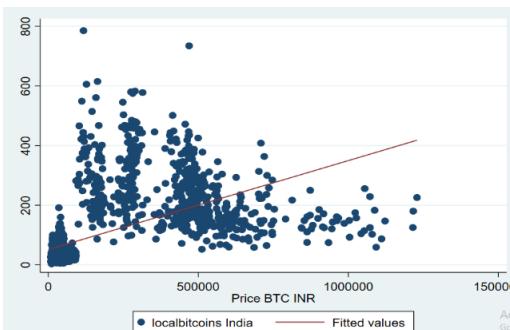


Figure 6: Volume of Trade vs Price of Crypto

REFERENCES

- [1] Scott, Brett (2016): How can cryptocurrency and blockchain technology play a role in building social and solidarity finance? UNRISD Working Paper, No. 2016-1, United

- Nations Research Institute for Social Development (UNRISD), Geneva.
- [2] Omri Marian, Are Cryptocurrencies 'Super' Tax Havens?, 112 Mich. L. Rev. First Impressions 38 (2013), available at
- [3] Fry, J. & Cheah, E.-T., Negative bubbles, and shocks in cryptocurrency markets, International Review of Financial Analysis (2016), .
- [4] Gabor, Daniela and Brooks, Sally Heather orcid.org/0000-0002-1005-1245 (2017) The Digital Revolution in Financial Inclusion: International development in the fintech era. New Political Economy. pp. 423-436. ISSN 1469-9923.
- [5] Chelliah, Paramasivan & Ganeshkumar, V. (2013). Overview of Financial Inclusion in India.
- [6] Abraham, M. (2019). Studying the patterns and long-run dynamics in cryptocurrency prices. *Journal of Corporate Accounting & Finance*, 31(3), 98–113.
- [7] *Blockchain, a Sustainable Solution for Cybersecurity Using Cryptocurrency for Financial Transactions in Smart Grids* (No. 978-1-7281-3385-0/19/\$31.00 ©2019 IEEE). (2019, June).
- [8] Caferra, R., & Vidal-Tomás, D. (2020). Who Raised from the Abyss? a Comparison between Cryptocurrency and Stock Market Dynamics during the COVID-19 Pandemic. SSRN
- [9] CCmara, N., & Tuesta, D. (2014). Measuring Financial Inclusion: A Multidimensional Index. *SSRN Electronic*
- [10] *Factors Influencing Cryptocurrency Prices: Evidence from Bitcoin, Ethereum, Dash, Litecoin, and Monero - Munich Personal RePEc Archive*. (2018). Munich Personal RePEc
- [11] Financial Inclusion in India: A case study of West Bengal - *Munich Personal RePEc Archive*. (2011). MPRA.
- [12] Garcia-Jorcano, L., & Benito, S. (2020). Studying the properties of Bitcoin as a diversifying and hedging asset through a copula analysis: Constant and time-varying. *Research in International Business and Finance*, 54, 101300.
- [13] Kumar Mallick, S., & Arvind Mallik, D. (2021). A study on the relationship between Crypto-currencies and official Indian foreign exchange rates. *Materials Today: Proceedings*.
- [14] Limba, T., Stankevičius, A., & Andrulevičius, A. (2019). Cryptocurrency as a disruptive technology: theoretical insights. *Entrepreneurship and Sustainability Issues*, 6(4), 2068–2080.
- [15] Liu, X. F., Jiang, X. J., Liu, S. H., & Tse, C. K. (2021). Knowledge Discovery in Cryptocurrency Transactions: A Survey. *IEEE Access*, 9, 37229–37254.
- [16] Marthinsen, J., & Gordon, S. (2019). A theory of optimum cryptocurrency scope. *Economics of Innovation and New Technology*, 30(2), 183–196.
- [17] *On Blockchain Applications: Hyperledger Fabric And Ethereum* (Volume 118 No. 18 2018, 2965–2970). (2018). <http://www.ijpam.eu>.
- [18] Rehman, M. H. U., Salah, K., Damiani, E., & Svetinovic, D. (2020). Trust in Blockchain Cryptocurrency Ecosystem. *IEEE Transactions on Engineering Management*, 67(4), 1196–1212.