SUMMARY, DISCUSSION AND RECOMMENDATION

DEMAND FOR MONEY, BITCOIN PRICE AND SUPPLY

SUMMARY AND FINDING

The bitcoin price fluctuates at the beginning of 2018, falls further from 2018 at a decreasing rate, til the mid-2019 when it began to rise. It remains stable with a little volatility from the last quarter of 2019 and rose further exponentially especially from the last quarter of 2020. According to Luke Conway in his post on investopedia.com/tech/cyptocurrency-this-week/ “Why is Bitcoin Price Rising”, the exponential rising was as a result of growing adoption of crypto as a payment method. Andrew Urguhart attributed the big influx of investors from large institutions such as pension schemes, University Endowment Fund and Investment Trusts as the reason for its increase. (University of Reading “Bitcoin: Why the price has exploded and where it goes from here” conversion.com/bitcoin-why-the-price-has-exploded-and-where-it-goes-from-here-152765.The average total liquidity preference for naira over the period of study stands at about 11,571,769 while bitcoin price stands at about $8,498. However, the bitcoin supply remains statistically stable having a minimum of 16,830,000 and a maximum of 18,590,000 averaging 17,786,389. The bitcoin price has a significant increase over the period starting with $3,468 and ending with $18,795 between 2018 and 2020.

In Nigeria, for the period of study, the minimum supply of money stands at N28,208,000.00 while the maximum supply of money stands at N38,627,000.00. averaging N33,648,361.11 for the period of study.For South Africa, for the period of study stands at R3,355,193,000 rand having the highest Rand value of R4,187,258,000 with an average value of R3,735,860 for the period of study. The minimum supply of money for Tanzania Shilling for the period of study stands at TZS24,433,800,000 having the highest TZS value of TZS30,003,200,000 with an average value of TZS27,035,841,667 for the period of study. The liquidity preference for the period averages around TZS12,633,527,778 with the highest standing at TZS14,869,900,000. the minimum supply of money for Kenya for the period of study stands at ksh3,020,102,000,000,000 having the highest shilling value of ksh3,990,900,000,000 with an average value of ksh3,478,720,000,000 for the period of study. The liquidity preference for the period averages around ksh1,372,822,000,000 with the highest standing at ksh1,759,898,000,000. However, the bitcoin supply remains statistically stable having a minimum of 16,830,000 and a maximum of 18,590,000 averaging 17,786,389.

The liquidity preference for naira equivalently remain stable from beginning of the period under study till the last quarter of 2020 where it begins to rise reaching as high as N16,000,000 at the end of 2020.The Demand for Money which proxies liquidity preference for the period averages around R1,857,901,000 with the highest standing at R2,463,667,000.

Generally in our analysis, the liquidity preference for all countries under consideration is correlated and positive with bitcoin price as the curve shows an upward movement even though, it appears not to be straight.This shows that as the price for bitcoin price increases, the liquidity preference increases.

In our analysis, it is discovered that 63% variation in liquidity preference could be explained by the changes in bitcoin supply. Also a percentage increase in bitcoin supply result in less than .001% increase in naira liquidity preference using the quadratic model. The increase in liquidity preference for naira in Nigeria has little or nothing to do with rise in bitcoin supply despite the high explanatory power of the model. Little wonder the responsiveness of liquidity preference to changes price of bitcoin is inelastic. A change in bitcoin price brings little change in liquidity preference for naira.

The regression result tells us that, the rise in liquidity preference for naira among residents in Nigeria can also be explained by some other lurking variables. According to the Central Bank of Nigeria, First Quarter Economic report 2020, the increase in liquidity preference is wholly due to the rise in transferable deposit. In other words, many deposit via debit and credit cards and other non-restricted and non-penalized transfer result in rise in liquidity preference in the first quarter in 2020. It could be deduced also that, the liquidity preference among Nigerians was not only for investment in bitcoin. Their desire to hold cash balances could as well be for transaction, precautionary and other investment purposes. In the Third Quarter CBN Economic Report 2020, it was reported that, “the growth in liquidity preference was due to rise in currency outside depository corporation and transferable deposit, reflecting demand for transaction balances amidst macroeconomic uncertainties surrounding the covid-19 pandemic”.

The liquidity preference for Rand increases in the first quarter 2018, decreases exponentially in the second quarter, remains stable for a while and increase at a constant rate till the last quarter of 2019. At the beginning of 2020, it sprouted to about R2,025,556,000, it dips from the second month and fluctuates till the penultimate quarter from where it increases further to as high as R2,463,667,000 by December 2020.

The coefficient of bitcoin to the liquidity preference for Rand suggests to be strong and statistically significant.There is absence of multicollinearity. This shows that the observed values of the independent variables are statistically uncorrelated.

We carry out further test for multicollinearity using the collinearity diagnostics, the Eigen value is significantly different from zero and the condition index is less than 10 which proves to us that multicollinearity does not exist in our model. This suggests that our model passes the test for independence.

The residual statistics table shows us that the predicted dependent variable is not statistically different from the observed values. It shows that the residual is statistically zero and as such the model is well fit. In other words, our model passes the test for homogeneity. The Mahal Distance shows that, there is no oulier in our model. The cook’s distance which measure the extent of change in model estimates when an influential observation is omitted guarantees us to not worry about our model. The centred leverage vale which is closer to zero explains to us none of the values of the independent variables is far away from the mean.

The P-P Plot compares the observed cummulative distribution function (CDF) of the standardized residual to the expected CDF of the normal distribution testing for the normality of the residual. We expect that the residuals are normally distributed. The PP plot shows that the cummulative observations revolve around the linear line which depicts that the model passes the assumption of normality. For further check for normality of the residual, the graphical plot of the standardized residual and the predicted value forms a non-patterned scatter plot which further proves that our model passes the assumption of normality.

Running a quadratic regression improves the estimates of our model. The explanatory power of model is improved and explains better the variation in the dependent variable, liquidity preference for Rand.

About 53% of the variation in the liquidity preference for Rand is explained by the model and the a percent change in bitcoin price results in just 1% increase in liquidity preference for Rand.That is, the rate of increase in bitcoin price in relation to liquidity preference for Rand is constant. Also, the responsiveness of Rand liquidity preference to changes in bitcoin is very low. That is, the liquidity preference in Rand does not respond very well in high magnitude to the increase in bitcoin price.However, bitcoin price only cannot explain the changes in liquidity preference for Rand, other variables are as well responsible. This could be attributed to low response to crypto purchase by many South African in 2018 and 2019 due to the risk of abscondment with fund(“a guide to understanding major cryptocurrency issues and regulatory framework: NT & PBO briefing”NCOP Finance Y. Carrim 25 May 2021).Despite the rapid adoption of bitcoin as a means of payment, the transaction time was too much and as such, could not fulfil the inclusive role (Brandon Topham, 2021). ( <https://pmg.org.za/committee-meeting/33029).>

Measuring the impact of bitcoin supply on liquidity preference for Rand gives that a unit increase in bitcoin supply result in about 40% increase in liquidity preference. The coefficient happens to be statistically significant with efficient standard error. The explanatory power of the model is strong. About 76% variation in liquidity preference is explained by the model.

The liquidity preference for Tanzania Shilling starts increasing in the first month of 2018, decreases exponentially in the second month, but fluctuates greatly till the mid-2019 but at a constant rate. Towards the end of the second quarters 2019, it begins to rise again compare to the previous two years.It falls again towards the end of the third quarter 2019 and begins to rise at constant rate from the last quarter of 2019 till the end of second quarters in 2020. from the third quarter of 2020, It takes another leap and rises further with little fluctuation till the end of 2020 halting at TZS14,313,600,000.

The coefficient of bitcoin price to the liquidity preference for Tanzania Shilling suggests to be strong and statistically significant. The VIF and the tolerance values show the absence of multicollinearity. This shows that the observed values of the independent variables are statistically uncorrelated.

Bitcoin price could only explain 24% variation in Tanzania liquidity preference. It suggests that there are other variables responsible for changes in demand for money in Tanzania in respect to bitcoin emergence.

This suggests the existence of positive correlation among the observed values in our time series data. The errors associated with one observation are correlated with the error of other observation. The presence of auto-correlation makes our linear regression to be inefficient, the estimated errors of the coefficient to be biased, hence, our hypothesis tests become biased, however, the OLS estimates remains unbiased. This is not unusual for time series data. The positive auto-correlation tells us to investigate further. One of the way to solve this, is to add another variable to our analysis.

We carry out further test for multicollinearity using the collinearity diagnostics, the Eigen value is significantly different from zero and the condition index is less than 10 which proves to us that multicollinearity does not exist in our model. This suggests that our model passes the test for independence.

The residual statistics table shows us that the predicted dependent variable is not statistically different from the observed values. It shows that the residual is statistically zero and as such the model is well fit. In other words, our model passes the test for homogeneity. The Mahal Distance shows that, there is no oulier in our model. The cook’s distance which measure the extent of change in model estimates when an influential observation is omitted guarantees us to not worry about our model. The centred leverage vale which is closer to zero explains to us none of the values of the independent variables is far away from the mean.

The P-P Plot compares the observed cummulative distribution function (CDF) of the standardized residual to the expected CDF of the normal distribution testing for the normality of the residual. We expect that the residuals are normally distributed. The plot in figure 3 above shows that the cummulative observations revolve around the linear line which depicts that the model passes the assumption of normality.

For further check for normality of the residual, the graphical plot of the standardized residual and the predicted value forms a non-patterned scatter plot which further proves that our model passes the assumption of normality.

We examine the relationship between bitcoin price and liquidity preference for TZS. The linear model produces a significant coefficient and other assumptions necessary to run linear regression are fulfilled except the auto-correlation. The explanatory power of the model is poor. This is not unusual for a univariate time series data and it calls for further investigation. One of the ways to handle a case where linear model passes all its assumption test except for autocorrelation is to add another predictor to the analysis. In our case, we will add bitcoin supply to the model.

Having included bitcoin quantity supplied in our model, the linear model produces a significant and positive coefficient and other assumptions necessary to run linear regression are fulfilled.The problem of auto-correlation we encounter using a univariate data was corrected. The explanatory power of the model becomes strong and significant explaining about 92.3% of the variation in the explained variable.A percentage increase in bitcoin price result in 63365% and 1949% change in bitcoin quantity supplied result increase in demand for Tanzania Shilling.

The liquidity preference for Kenya Shilling increases steadily from the first quarter 2018 till the last quarter of 2018 at a constant rate even though there is a slight fluctuation. It increases further in the following year compare to the previous year at a constant rate with so much fluctuations, and steps up further to increase from the last month of 2019 and sprouts to as high as ksh1,600,000,000,000 at the middle of 2020, it rises further compare to the previous year till the end of 2020 to a tune of ksh1,720,337,000,000.

Testing for a suitable model, it appears that the linear regression is good but with poor explanatory power. Moreso, none of the regression models provides a high explanatory power. However, the linear model provides the best F-statistic which explains to us that the joint effort of all the independent variables are better compare to other models. It has the lowest p-value to let us know that the coefficient is statistically strong and significant. We, however will stick to linear regression model as the model that best fit our dataset.

The coefficient of bitcoin to the liquidity preference for ksh suggests to be strong and statistically significant. The VIF and the tolerance values show the absence of multicollinearity. This shows that the observed values of the independent variables are statistically uncorrelated.

The time series dataset suggests that the model is linear, even though, the explanatory power of the linear regression is poor.The explanatory power of the model seems not to be good enough. Bitcoin price could only explain 20.6% variation in Kenya liquidity preference. It suggests that, there are other variables responsible for changes in demand for money in Kenya.

We carry out further test for multicollinearity using the collinearity diagnostics, the Eigen value is significantly different from zero and the condition index is less than 10 which proves to us that multicollinearity does not exist in our model. This suggests that our model passes the test for independence.

The residual statistics table shows us that the predicted dependent variable is not statistically different from the observed values. It shows that the residual is statistically zero and as such the model is well fit. In other words, our model passes the test for homogeneity. The Mahal Distance shows that, there is no oulier in our model. The cook’s distance which measure the extent of change in model estimates when an influential observation is omitted guarantees us to not worry about our model. The centred leverage vale which is closer to zero explains to us none of the values of the independent variables is far away from the mean.

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DISCUSSIONS

We examine the impact of bitcoin price and quantity supplied on the liquidity preference in four African countries listed among the top countries with crypto adoption index, namely, Nigeria, South Africa, Kenya and Tanzania.

In Nigeria,the bitcoin price and supply have little or no impact on the liquidity preference for naira. Even though, there was a high rate of adoption of crypto in 2018 and 2019, the emergence of covid-19 pandemic in 2020 which resulted to macroeconomic uncertainties increased the money outside the depository institutions especially for transactionary purposes. This is not so much different from the experience of other African countries. In South Africa, the high rate of fund abscondment and the emergence of covid-19 in the year 2020 add to the low responsiveness to changes in the price of bitcoin. In Tanzania, there has not really been a widespread use of crypto. Little wonder the President called on the Tazania Central Bank to begin working on facilitating the use of cryptocurrencies (rober hart,2021“Tanzaia Considers Crypto-and Boost Bitcoin-As Nationa Line Up Behind Elsavador to Embrace Decentralized Finance). In a country like Kenya, that is open to foreign monetary and financial influence especially the innovation that affects economies, it will not be surprised that crypto will affect the allocation of cash balances. The opportunity cost of holding money has three considerations: the own-rate of return, rate of return on assets alternative to holding of money and the expected rate of inflation.(Sichei, 2012 “Demand for money: Implications for the Conduct of Monetary Policy in Kenya” international Journal of Economics and Finance). it is expected that economy which finds itself with high inflation, depreciated currency with low productivity and little or no opportunity for investment will find crypto emergence as an opportunity. Kenya inflation as at 2018 revolves around 4.69%, 5.20% I 2019 and 5.41% in 2020. the inflation rates are quite moderate for the period of study and currency happens to be strong against dollars. It supports our finding on the reason for low response of liquidity preference to rise in bitcoin price.(www.centralbank.go.ke/inflation-rates/). only 8.5% of Kenya population own cryptocurrency in 2018 (triple-a.io/crypto-ownership-kenya/).

RECOMMENDATION

Based on our finding, we recommend the following:

1. Nigerian government should lift the ban on the use of cryptocurrency, encourage local platform for trading of cryptocurrency under regulations in order to have control on excesses that surround the activities of cryptocurrency. Many Nigerians hold cash balances for transactionary purposes with little or nothing fr investment, it shows a high rate of food inflation ravaging the people of Nigerian. Every effort should be made by Nigerian government at reducing food inflation especially at a period the world is preaching stay-at-home.
2. The South African government has lot to do with encouraging its citizens to create platforms for South Africans to trading cryptocurrency. Cryptocurrency is not ban in South Africa but the existence of many fraudulent vendors discourage people in engaging in the business of crypto.
3. The government of Tanzania has taken a good step at ensuring wider spread of cryptocurrency among its people. However, the situation in South Africa must be addressed to not happen to the people of Tanzania.
4. The Kenyan has no worry about storing wealth in bitcoin as there are many other reliable investment with good returns on investment in Kenya. Also, the low inflation rate compare to other African countries is a good macroeconomic stimuli to go by. However, in a world of digital advancement, the people have to be encouraged to stay afloat of the happenings in the digital world, especially in the world of crypto mining and trading.