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THE EXPECTED MONETARY EFFECTS OF CRYPTOCURRENCIES: A STUDY OF THEIR DEALING IN TEN FOREIGN COUNTRIES

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Abstract
Cryptocurrencies are not,as generally known,supported by any official party and are used via the Internet only within the scope of companies and individuals that prefer to deal with each other. Cryptocurrencies can also be exchanged by paper currencies such as dollars, euros and others.This research aims to demonstrate the impact of cryptocurrencies on monetary policy. The study obtained the descriptive analytical approach to identify the impact of cryptocurrencies on monetary policy. The study found that cryptocurrencies have an impact on monetary policy through their impact on money supply and inflation. Furthermore, cryptocurrencies affect the quantities of global money supply and will limit the ability of central banks to effectively implement monetary policies if they remain along the same lines of spread.Findings also revealed thatcryptocurrencies affect the tools and objectives of monetary policy in a positive way for foreign countries, for example, they also facilitate the process of money laundering and smuggling. On the contrary, they also negatively affect the inflation rate in the foreign countries that mostlyuse the cryptocurrencies.

Keywords: Cryptocurrency, inflation, monetary policy, money supply.

1 -Introduction

Many economic activities related to technological changes such as E-software, the Internet economy and digital moneys have emerged. Cryptocurrencyis one of the outputs of Blockchain technology, and this technology is the basic regulator of digital currencies up-to-date.

Since the vast popularity and simplicity that this type of currency is characterized by, the digital currency has no physical presence; it is transactedon the Internet only. Likely, it is created through distinct computer programs. Furthermore, it is one of the exciting and astonishing manifestations of progress.

Positively perceiving it, we can expect digital currencyfor revolutionizing the economic and commercial field in multiple aspects like financing and transactions. Moreover, digital currency can enhance financial inclusion by offering individuals without official bank accounts alternative, affordable payment options.

The importance of digital currencies lies in keeping pace with the necessities of an era that is characterized by speed and increased transactions. Likely, it is generated form the need to use a method of financial exchanges characterized by ease and speed via smart phones and means of modern technology. All these are achieved by virtual currencies. Therefore, this study reviews the topic of cryptocurrencies and their monetary effects in many foreign countries that deal with them.

1.1 The research importance

The study significance emerges from the significance of the topic it explores, i.e., cryptocurrencies. Such a topic is described as a contemporary topic. Furthermore, the rise in dealing with cryptocurrencies to the financial marketplaces, identifying cryptocurrencies and their impact on monetary variables in a group of foreign countries. Besides, the current period is witnessing an increased severity in the use of cryptocurrencies. Moreoverm cryptocurrencies could be a financial innovation that combines economics, finance and technology.

1.2 Research problem

The problem of this researchlies in the following question:

What are the effects of cryptocurrencies on the monetary policy of foreign countries? And what are the impact of cryptocurrencies on the money supply and inflation?

1.3 Hypothesis of the study

The paperhypothesizes that there areseveral expected effects of cryptocurrencies (Bitcoin) on many monetary variables and the money supply.There are monetary effects (monetary supply and inflation) of Cryptocurrencies on countries coping with such currencies.

1.4 Research objective

This study attempts to investigate the impact of coping with cryptocurrencies on the potential monetary variables of Bitcoin, and the technology of using the Internet because of their key role in the economy, like inflation and money supply.

1.5 The study population and sample

The sample of this study was 10 of the most world countries use of the cryptocurrencies including (India, America, Russia, Nigeria, Brazil, Pakistan, Indonesia, Vietnam, Ukraine, and Kenya).

1.6 Research design

For the purpose of estimating and testing the main factors affecting cryptocurrency indices, modern econometric methods were used, such as the modern (Eviews V10) program represented by the Pooled Regression Model, Fixed Effect Model, and Random Effect Model. Hence, three economic modelswere built, each of these models includes all the research variables.According to the basic models for analyzing time series to check the causal relationship of the effects of cryptocurrencies on the economy, a simple linear regression model wasobtained to measure the direction of the relationship between the dependent variable (Yij) represented by monetary variables, and the independent variable (Xij) which represents cryptocurrencies (Bitcoin), the Internet users and ATMs.

2. Literature review

2.0 The effects of economic monetary

2.1The effects of cryptocurrencies on the monetary supply

The entry of new payment systems such as cryptocurrenciesinto themarkets leads to an inflation in the monetary quantity (money supply) within a single country, especially with its high values, according to the demand of the people of that country to use. Countries such as Japan and the United States, for example, suffer from a large demand of their citizens to use this type of currency.Such countries have faced apparent and clear challenges. Furthermore, this phenomenon is transmitted to other countries by increasing the users of this currency and by e-commerce, which affects the levels of international aggregate supply, and then there will be more global inflation, especially due to the amount that has been pumped into the market which exceeded 500 billion dollars. The pumped amount is not only large but also on continuous increase. It therefore raises the risk of considering it a financial bubble to become a global financial bomb, especially with the continuous collapses in their value andfluctuation significantly(Ahmed *et al.,* 2018).

It is noticeable that the demand for cryptocurrencies affects the demand for legal money. The relationship is inverse, the greater is the demand for cryptocurrencies, the lower the demand for legal money becomes. Hence, cryptocurrencies are used in electronic commerce and replace legal money. They threaten economic stability and leadto increased inflation and limitthe role of the central bank in controlling interest rate and money supply (Kubát, 2015).

2.2 Effects of cryptocurrencies on inflation

It is the decreases of the currency purchasing power. Most cryptocurrencies are subject to inflation. Inflation usually occurs when the supply of cryptocurrency increases, once happened, the cryptocurrency under studyis less rare, and the demand starts falling which leads to a decrease in its price and purchasing power (Andrikopoulos*et al*, 2018).

Many economics viewed cryptocurrencies as a good hedge against inflation. This view stems from the fact that Bitcoin has a stable total of 21 million coins. Still,many believe that this makes the cryptocurrency a deflationary, and thus inflation-resistant. Some others have claimed that the cryptocurrency go through much higher inflation rates than the benchmark currencies due to the impact of some factors such as the increased energy and production costs lead to inflation(Jankov,2017). Furthermore, Over the passage of a year, several cryptocurrencies will have extremely high inflation rates, but this is only the short term picture; several cryptocurrencies want to gradually lower their inflation.

Cryptocurrencies just need to set a cap on the quantity of new tokens they produce in order to reduce inflation. However, because each cryptocurrency operates differently and has a unique inflation process, there is no universal answer. The inflation methods of certain cryptocurrencies are preferable to those of others. Therefore, Bitcoin's block rewards are regularly cut in half, which makes mining less profitable,

deters miners, and ultimately reduces the amount of money produced. This is how Bitcoin aims to minimize inflation. Many cryptocurrency companies use the same technology to prevent inflation (Ciaian*et al*, 2018)

3. Analyzing and measuring the effect of cryptocurrencies on the economic reality on a sample of foreign countries between (2011-2020)

31. Estimating the impact of cryptocurrency indicators on the inflation rate in foreign countries

The three primary panel models have already been stated. The issue of which model is best for the data from the current investigation then becomes apparent. The researchers compare the (combined) aggregate regression model with the fixed effects model as the first of two strategies used to address this subject. In the event that the fixed effects model is approved, the following second approach will be used to compare the fixed effects model to the 312 random effects model:

Table 1 shows the regression analysis for the sample of foreign nations using the three panel data models for the years 2011 to 2020.

	Method of Estimation					
	Aggregate regression		Fixed Effects		Random effects model	
Explanatory variables	Coefficient	Prob.	Co-efficient	Prob.	Coefficient	Prob.
X1	-0.000255	0.1053	-0.000311	0.0316	-0.000287	0.0436
X2	-4.26E-05	0.2086	2.68E-05	0.4407	-1.49E-05	0.6425
X3	0.003324	0.7885	-0.131842	0.0490	-0.003181	0.8276
C	7.567506	0.0000	15.10389	0.0001	7.923105	0.0000
	Results of Pendle test					
Adjusted R-squared			0.034825		0.226516	0.023532
F-statistic			2.178654		3.391626	1.787240
Prob(F-statistic)			0.095607		0.000440	0.154839
D-W			1.199357		1.587281	1.336444

Table 1 clearly shows the outcomes of the regression employing the panel data models for a model of foreign nations as follows:

3.1.1 Pooled Regression Model(PME)

According to the regression results employing panel data models for a model of foreign nations, it is noticeable that there is an inverse relationship between the Bitcoin index and the Internet users (X1,X2) with the rate of inflation. That is, the higher is the use of the Bitcoin index, and Internet users (X1,X2), led to a decrease in the rate of inflation.The ATM indicator (X3) and inflation rate have a direct correlation, as seen in Table 1. The independent variables (X1, X2, and X3) could only account for 3% of the changes in the dependent variable (Y1), according to the Adjusted R-squared test, and the remaining 97% is attributable to variables not included in the model. The capacity of the independent factors to predict the dependent variable is what is meant by the 3 percent, in other words. Regarding the F-statistic test at a higher-than-probability threshold of Prob (0.095607), (5 percent). It conveys complete insignificance. From a statistical perspective, the statistics of (D-W) show that the model peaked at (1.199357), which explains why the autocorrelation issue is absent from the model.

3.1.2 Fixed Effects Model(FEM)

The panel data models' regression findings for a sample of international nations revealed an inverse association between the inflation rate, the ATM (X1, X3), and the Bitcoin index. The inflation rate decreases as the use of (X1, X3) increases. As for how closely the Internet user index (X1, X3) is tied to (Y1). Additionally, according to the findings of the Adjusted R-squared test, the independent variables (X1, X2, and X3) were able to account for 22% of the variations in the dependent variable (Y1). The residual (78%) is a result of additional elements that the model could not capture. The capacity of the independent factors to predict the dependent variable is, in other words, 22%. As tothe,F-statistic test at a probabilistic level of (0.000440) is less than (5%). It shows the whole significance of the model from a statistical standpoint, and the (D-W) statistics show that the modeltouched its peak (1.587281). This demonstrates that the model has no autocorrelation issues.

3.1.3 Random Effects Model (REM)

According to the regression results which used panel data models for a model of foreign countries, there is an inverse relationamong the cryptocurrency indicators (X1,X2,X3) and the rate of inflation. The higher is the employment of cryptocurrency indicators, the lower the inflation rate becomes.The results of the Adjusted R-squared test indicated that the independent variables (X1, X2, X3) explained (2%) of the changes in the (Y1)dependent variable. However, the remanent (98%) were associated to the rest of factors exincluded in the model. To say it in other word, 2% is the capability of the independent variables(X1, X2, X3) to predict the(Y1) dependent variable. As for the (F-statistic) test at a probabilistic level of (0.154839) which is larger than (5%). It shows that the overall insignificance of the model from a statistical point of view. Its peak is (1.336444). Itstates that the model is devoid of the autocorrelation issues.

3.1.4 Selecting the apt model for the research

For the purpose of determining the most appropriate technique of analysis for the data of the study, the Chow test was employed to compare among the aggregative model and the fixed effect. Likely, the Hausman Test was obtained to perform the differentiation tests for the fixed and random effects models as follows:

3.1.4.1. Comparison among the aggregative model and the fixed effect using the Chow test

Table 2exhibits the differentiation results between the aggregative model and the fixed effect. The results aim to determine the most appropriate model through arestricted Fisher (F) statistical test among the aggregative model and the model of fixed effects. The (F) test reached at the probabilistic level of Prob (0.0007) which is less than (5%). Thus, we reject the null hypothesis and accept the substitute hypothesis, that is, we select the fixed effects model.

3.1.4.2 Comparison among the random and fixed effects models using Hausman Test

Table 2. The comparison between the random and fixed effects model

		Correlated Random Effects - Hausman Test	
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	13.903003	3	0.0030

It is evident from Table 3 that findings are illustrated to detect the appropriate model through the restricted Fisher (F) statistical test among the random and fixed effects model. The (F) test reached at the probabilistic level is less than (5%), Therefore, we adopt the fixed effects model and reject the null hypothesis while accepting the substitute hypothesis.

Table 3. Accumulative model and fixed effect

			Redundant Fixed Effects Tests Test cross-section fixed effects
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	3.615973	(9,86)	0.0007
Cross-section Chi-square	31.772550	9	0.0002

3. 2 Estimating the impact of cryptocurrency indicators on the money supply in foreign countries

There are three primary panel models, as was previously noted. As a result, the issue of whether model is best for the information in the current research emerges. The researchers employ two tests to address this query; the first contrasts the aggregative (common) regression model with the fixed effects model. In order to compare the fixed effects model to the random effects model, assuming the fixed effects model is adopted, we utilize the second test. These are:

Table 4 shows the regression findings for the sample of foreign countries using the three panel data models for the years 2011 to 2020.

					Method of Estimation	
	Aggregate regression		Fixed Effects		Random effects model	
Explanatory variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
X1	0.000773	0.3826	0.000997	0.0001	0.000994	0.0001

X2	0.000170	0.3841	2.01E-05	0.7506	2.12E-05	0.7374
X3	0.108223	0.1334	0.076959	0.5164	0.088147	0.4053
C	56.64054	0.0000	58.45212	0.0000	57.81371	0.0000
						Results of Pendle test
Adjusted R-squared			0.035258		0.924225	0.152923
F-statistic			2.206050		101.6253	6.957493
Prob(F-statistic)			0.092343		0.000000	0.000276
D-W			0.021676		0.294606	0.272391

Table 4 clearly shows the findings of the regression employing the panel data models for a sample of foreign countries, as follows:

3.2.1 Pooled Regression Model(PME)

The results of regression making use of panel data models for a sample of foreign countries in Table 4 shows a direct correlationamong the cryptocurrency indices (X1, X2, X3) and the money supply index (Y3), that is, the higher is the use of cryptocurrency indicators, the higher the money supply becomes. Besides, the amended R-squared test showed that the independent variables (X1, X2, X3) explained (3%) of the changes in the (Y3)dependent variable. Likely, (97%) were due to the rest of factors not belonged to the model, frankly,the (3%) is the independent variables' ability to guess the dependent variable. As to the (F-statistic) test at a probability level of Prob (0.092343), i.e., greater than (5%) indicating the general insignificance of the model statistically. Finally, the (D-W) statistics whichgot to the highest point (0.021676). Such valueshows that the model is affected by autocorrelation.

3.2.2 Fixed Effects Model(FEM)

The regression results which used panel data models for a model of foreign nations shows that there is a direct correlationamong the cryptocurrency indices (X1, X2, X3) and the money supply index (Y3), that is, the higher is the use of cryptocurrency indicators, the moreis the money supply. The Adjusted R-squared test indicated that the independent variables (X1, X2, X3) described (92%) of the fluctuations that occurred in the (Y3)dependent variable. (8%) was resulted byfurther factors excluded in the model. Moreover, (92%) stands for the capacity of the independent variables to guess the dependent variable. Furthermore, the F-statistic test at level of Prob (0.000000) which is less than (5%). It points out the generalsignificance of the model statistically. Finally, the (D-W) statistics indicate that model reached its peak (0.294606), which explains that the model might have autocorrelation issues.

3.2.3 Random Effects Model (REM)

The results ofregression making use of panel data models for a model of foreign countries indicated that there is a direct correlationamong the cryptocurrency indices (X1, X2, X3) and the money supply index (Y3), that is, the higher is the use of cryptocurrency indicators, the more is the money supply. The Adjusted R-squared test revealed that the independent variables (X1, X2, X3) have clarified (15%) of the alterations in the dependent variable (Y3). (85%) are due to other factors not included in the model. To say it differently, the ability of the independent variables is estimated by (15%) to predict the dependent variable. Moreover, the F-statistic test at a Prob level of (0.000276) which is less than (5%). From a statistical point of view, it shows the general significance of the model. Finally, the (D-W) statistics show that the modelwent to the highest point (0.272391). This describes that the model might have undergone autocorrelation issues.

3.2.4 Selecting the apt model for the research

For specifying the best suitable method of analysis for the research data, the Chow test was employed to make a comparisonamong the aggregative model and the fixed effect. Furthermore, Hausman Test was obtained to perform the typical comparison tests for random and fixed effects as follows:

3.2.4. 1. Comparison among the aggregative model and the fixed effect using the Chow test

Table 5. The comparison between the aggregative model and the fixed effects

			Redundant Fixed Effects Tests
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	126.138135	(9,87)	0.0000
Cross-section Chi-square	264.253503	9	0.0000

Table 5 presents the results to determine the most suitable model using a restricted Fisher (F) statistical test to compare between the aggregative and the fixed effects model. The (F) test was at Prob (0.000000), i.e.,

less than (5%). Therefore, the null is rejected and approve the substitute hypothesis, i.e., the fixed effects model is adopted.

3.2.4.2. Comparison between the fixed and random effects models using Hausman Test.

Table 6. The comparison between the random and fixed effects model

			Correlated Random Effects - Hausman Test
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	0.235801	3	0.9716

Table 6 presents the results to determine the most suitable model using a restricted Fisher (F) statistical test to make a comparisonamong the aggregative and the fixed effects model. The (F) test was at Prob (0.9716), i.e., less than (5%). Therefore, the null is rejectedand the alternative hypothesis is approved, i.e., random effects model is adopted.

4. Conclusions

After reviewing the theoretical aspect and getting familiarity with the topic of cryptocurrencies and other variables that came along with, employing them to serve the topic of our current study, testing the relationship between cryptocurrencies and monetary variables as well, and observing the results, the study reached a set of conclusions, the most important are:

1- Cryptocurrencies have an impact on monetary policy due to their effects on the money supply and inflation. Cryptocurrencies affect the quantities of global money supply and limit the ability of central banks to implement monetary policies effectively if they remain on the same path of spread. Furthermore, the cryptocurrencies positively affect the tools and objectives Monetary policy for foreign countries. They also facilitate the process of money laundering and smuggling; they negatively affect the inflation rate of the foreign countries which mostlyuse the cryptocurrencies.

2- Cryptocurrencies will change the techniques and methods of the monetary sector and banks all over the globe. Given that Bitcoin is not regulated by a single entity and is not regulated by a single set of laws.Therefore,without the need of a middleman, currency transaction takes place directly between merchants.

3- Due to their unique properties, cryptocurrencies offer numerous advantages both economically and personally. However, they also come with a number of risks and difficulties, particularly those related to fraud, money laundering, and financing terrorism. They put the monetary system's safety and stability under danger. Therefore, depending on the national setting, there are demands for the regulatory authorities to either regulate or forbid cryptocurrencies.

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