THE INFLUENCE OF INTERNAL AND EXTERNAL VARIABLES ON THE WORLDETHEREUM PRICE: COINTEGRATION ANALYSIS

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Abstract

This study aims to analyze the impact of internal variables, including total Ethereum, number of transactions, fees per transaction, and number of active wallets, as well as external variables, namely the price of Bitcoin and the price of gold, on global Ethereum prices. The study utilizes daily data covering the period from December 31, 2016, to December 31, 2021. The data analysisemploys time series data with the assistance of Eviews 10 and the error correction model (ECM) method. The study's findings indicate that total Ethereum, number of transactions, fees per transaction, number of active wallets, price of Bitcoin, and price of gold collectively exert a significant influence on Ethereum prices. However, when examined individually, total Ethereum demonstrates a negative impact and lacks statistical significance on Ethereum prices. Similarly, the number of transactions exhibits a negative and significant effect on Ethereum prices. Conversely, transaction fees, number of active wallets, and the price of Bitcoin have a positive andsignificant impact on Ethereum prices. Meanwhile, global gold prices do not exhibit any influenceon Ethereum prices.

Keywords: Crypto Assets; Ethereum; altcoins; gold price; ECM.

JEL Classification: G12, G14, G19

INTRODUCTION

In this era of modernization, the rapidadvancement of science and technology has given rise to the concept of digital money, aiming to eventually replace physical currency. Digital currency, commonly knownas cryptocurrency, employs cryptography forits security system, making it highly resistantto counterfeiting or duplication (SOVBETOV, 2018). Moreover, cryptocurrency transactions can be conductedthrough a peer-to-peer network without the need for a third party as an intermediary (Widad & Taofik, 2020).

In Indonesia, the recognition of cryptocurrencies has been formalized byBappebti (Commodity Futures Exchange Trading Supervisory Agency), which includes cryptocurrencies as one of the groups within commodities. This classification is based on the blockchain system, considering digital commodities or crypto commodities as rights or interests falling under the commodity category in UU No. 10 of 2011. This acknowledgment positions cryptocurrency asa crypto asset, presenting itself as an alternative investment for both short-term andlong-term strategies aimed at realizing profits(Naufal, Robiyanto & Hans, 2022)..

Similar to Indonesia, most Central Banks worldwide currently prohibit the use of crypto assets as legal tender due to the lack ofcontrol by the local monetary authority(Central Bank). However, in recent years, some countries, including Puerto Rico, El Salvador, California in the United States, andvarious European Union countries through theEuropean Court of Justice (ECJ), have accepted crypto assets, particularly Bitcoin, asa valid means of payment (Syamsiah, 2017). At present, in addition to Bitcoin, hundreds ofalternative crypto

assets (altcoins) with similar general designs have emerged(Tikhomirov, 2017).

As of August 8, 2022, the crypto assetindustry has recorded 21,282 coins, with a certainty of continued growth (Coinmarketcap, 2022). One notable exampleamong the myriad altcoins is Ethereum(ETH). Ethereum operates as a blockchainnetwork with a digital coin called Ethereum (ETH), serving as a platform for various financial service applications, games, and applications that prioritize user data security (ethereum.org). In recent years (2017-2022), Ethereum has positioned itself as one of the most extensively 'mined' alternative coins, securing the second position in crypto asset market capitalization after Bitcoin, establishing itself as Bitcoin's strongest competitor.

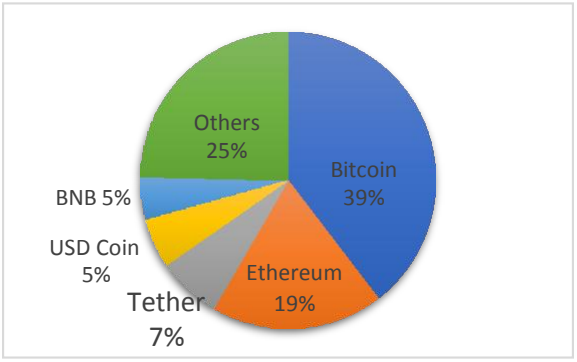

Figure 1. World Crypto Asset MarketCapitalization August 2022

Source: Coinmarketcap 2022, processed

Presently, the crypto asset market remains predominantly influenced by Bitcoinand Ethereum, collectively commanding over half of the global crypto asset market value. Specifically, 58% of the market capitalizationis distributed, with 39% being dominated by Bitcoin and the remaining 19% under the control of Ethereum. Despite not possessing the revolutionary impact synonymous withBitcoin, Ethereum has emerged with the objective of addressing the shortcomings inherent in the Bitcoin system. It achieves thisby establishing an ecosystem that encompasses multiple functions. This distinctive approach serves as the primarymotivation for the author's research focus on Ethereum.

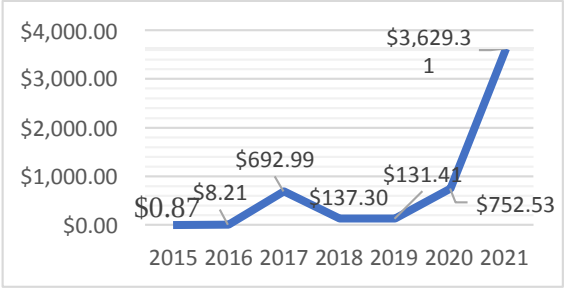

Figure 2. Ethereum Crypto Asset PriceMovements for 2015 – 2021

Source: Etherscan.io 2022, processed

The development of Ethereum's price, initiated in 2015, has consistently

demonstrated a substantial increase. By the close of 2016, one Ethereum (ETH) equated to 8.21 USD. Subsequently, there was a significant surge in early 2017, followed by declines in early 2018 and 2019. Ethereum (ETH) experienced a remarkable spike in 2021, reaching a value of USD 3629.31 per unit. As of May 8, 2022, one Ethereum is valued at IDR 37,498,000 (Indodax, 2022), indicating a sustained increase in demand forEthereum year after year.

The factors influencing crypto asset prices can be categorized into internal and external factors (Poyser, 2017). Internal factors, such as supply and demand, directly impact the market price of crypto assets. External determinants include attractiveness (popularity), legalization (adoption), and various macrofinancial factors like interestrates, stock market conditions, and the price of gold. Ethereum is often likened to gold, both being regarded as commodities due to their appeal as alternative investments (Bouoiyour & Selmi, 2016).

In addition to these factors, Bitcoin prices can exert an influence on the entire crypto asset market. In a bullish Bitcoin market (where asset prices are on the rise), it is likely that other coins, including Ethereum,will also experience proportional increases.

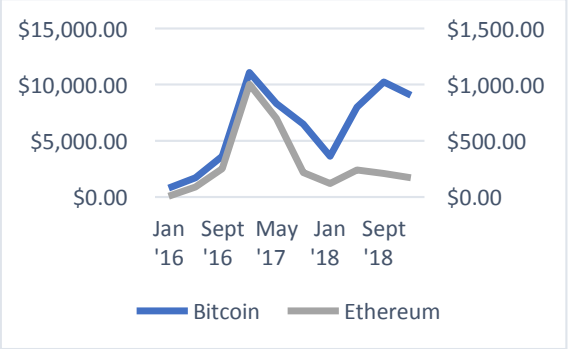

Figure 3. Ethereum and Bitcoin Price MovementJanuary 2016 – January 2019

Source: Coinmarketcap 2022, processed

The price movements of Ethereum and Bitcoin crypto assets exhibit a correlation, where correlation refers to the phenomenon ofboth assets moving in the same direction. This correlation was evident during the Bitcoinprice crash in early 2018, which was followedby a simultaneous decline in the prices of other coins, including Ethereum.

According to Michaël van de Poppe, acrypto asset analyst at the Amsterdam Stock Exchange, Ethereum will consistentlymaintain a correlation with Bitcoin. Heemphasizes that Bitcoin, being the dominant player, sets the tone for the market, and otherassets typically follow suit. Van de Poppedraws parallels with the commodity market, where gold, as the primary asset, influences the price changes of other metals. Despite thiscorrelation, some opinions suggest that Ethereum's high correlation doesn't necessarily indicate dependency on Bitcoin but rather underscores Ethereum's recognitionas an independent asset with a more significant price impact compared to otheraltcoins.

The number of active wallets plays a crucial role as an indicator influencing the price of Ethereum. It serves as a metric to gauge whether a coin is in an overbought or oversold phase. Additionally, the indicator forthe number of active wallets reflects the strength of the crypto asset community, as a higher number of active wallets indicates a more robust community presence.

LITERATURE REVIEW

Money

In the perspective of Nopirin (1998), money is defined as anything that can beutilized or received for the purpose of makingpayments for goods, services, or debts. This concept aligns closely with the definition provided by Solikin and Suseno (2002), who describe money as an object capable of beingexchanged for other items, used to assign value to other commodities, and stored for future use. Both definitions highlight the versatile and essential role of money as amedium of exchange, a unit of value, and a store of value.

Monetary Theory

As per Boediono (1998), monetary theory encompasses the study of the demand and supply of money, as well as their interconnections. This theory delves into howalterations in the money supply, or changes inthe interaction between money supply anddemand, influence and ultimately determine the value of money. In essence, monetarytheory explores the dynamics between thequantity of money in circulation and the factors influencing its demand, elucidatingthe consequential impact on the overall valueof money.

Digital Currency, Virtual Currency, dan Cryptocurrency

According to the InternationalMonetary Fund (IMF), digital currency, as outlined by Habermeier (2016), is defined as a representation of digital value. Cryptocurrency is a subset of virtual currency,which itself falls under the broader concept ofdigital currency. In addition to virtual currency, digital currency also encompasses electronic money. The key distinction between virtual currency and electronic money lies in the issuer; electronic money is regulated by the government and is typically denominated in the official currency of the respective country.

Ethereum

Ethereum is a decentralized software platform designed to facilitate the creationand execution of Smart Contracts and Distributed Applications (DApps) without thepresence of downtime, fraud, control, or interference from third parties. Ethereum establishes a blockchain network specificallytailored for its native cryptocurrency, Ether (ETH). The platform's ecosystem has expanded significantly, driven by smart contract technology, enabling the development of numerous applications and cryptocurrencies on the Ethereum network. This ecosystem has contributed to a diverse range of innovative projects and decentralizedapplications within the Ethereum blockchain.

PREVIOUS RESEARCH

While the phenomenon of crypto assets, including Bitcoin and Ethereum, is relatively new, there has been substantial research examining their relationships with other assets. Several studies have been conducted toexplore the dynamics and connections between crypto assets and traditional financialinstruments. These investigations aim toprovide insights into how crypto assetsinteract with established asset classes and financial markets. The research often delves into aspects such as market behavior, correlations, risk factors, and the broader impact of crypto assets on the financial landscape.

Table 1. Previous Research

Research	Variable	Results

Dennis van Wijk, 2013	Dependent variable: 1. Value of Bitcoins Independent variables, global macrofinance developments: 1. Bitcoin to US Dollar, Euro & Yen exchange rates 2. Dow Jones stock market index, FTSE 100, & Nikkei 225 3. Brent oil prices, West Texas Intermediate (WTI), & CMCI	1. The Dow Jones Stock Index, the Euro-Dollar exchange rate, & the price of WTI oil have a significant influence on the value of Bitcoin in the long term. 2. The value of the Dow Jones stock index also significantly affects the value of Bitcoin in the short term 3. Global macrofinancial developments could drive Bitcoin's price in the long term.
Pavel Ciaian, Miroslava Rajcaniov, d"Artis Kancs 2015	Dependent variable: 1. Bitcoin price Independent variable: 1. Bitcoin demand & supply 2. The strength and attractiveness of Bitcoin for investors & users	1. Market forces supply & demand for Bitcoin have an impact on the price of Bitcoin 2. Online information about Bitcoin has no impact on the price of Bitcoin in the long term 3. Investor speculation hypothesis affects the price of Bitcoin 4. Global macrofinancial developments may drive Bitcoin price in the short term 5. Wijk's (2013) estimate, which does not take Bitcoin demand & supply variables into account, can be biased
Risma Widyawati 2015	Dependent variable: 1. Bitcoin price Independent variable: 1. Total Bitcoins 2. Market capitalization 3. Number of transactions 4. Cost per transaction	1. The results of the VECM estimation, the price of Bitcoin on the first difference of total Bitcoin & the number of transactions have a positive effect, while the market capitalization & cost per transaction have a negative effect 2. Johanson test results, IRF analysis, Variance Decomposition analysis show that the Bitcoin price is most influenced by the previous Bitcoin price. Meanwhile, the total Bitcoin variables, market capitalization, number of transactions, and cost per transaction have little effect.

Olivea Angela 2021	Dependent variable: 1. Ethereum price Free Variables: 1. EUR/USD exchange rate 2. Gold Price 3. Bitcoin price 4. Ripple Price 5. Stellar Price 6. Litecoin Price 7. Monero prices	1. From this study, it was found that in the short term, the EUR/USD exchange rate has a significant influence on the price of Ethereum, 2. While the world gold price does not show any influence on the price of Ethereum 3. Altcoin prices, represented by Bitcoin, Litecoin, and Monero, show significant influence

RESEARCH HYPOTHESIS

Total Ethereum refers to the overall amount of Ethereum circulating in the cryptoasset market, denominated in ETH units. While the total supply of Ethereum is not capped, an annual release of 18 million Ethereum is permitted for trading. As of August 2022, records from Etherscan indicatethat 120 million ETH are in circulation. This total Ethereum is considered an internal variable that can impact the price of Ethereum, influencing demand and supply dynamics.

In addition to total Ethereum, other internal factors affecting Ethereum prices include the number of transactions and the cost per transaction. The number of transactions represents the daily occurrences of Ethereum transactions, involving the transfer of value between Ethereum wallets recorded on the blockchain. The cost per Ethereum transaction constitutes the paymentto miners for their role in operating the Ethereum system, expressed in USD. According to Poyser (2017), these internal factors play a role in influencing Ethereum prices, with insights from Risma Widyawati (2015) suggesting that factors such as total crypto assets, number of transactions, and cost per transaction can impact crypto asset prices positively or negatively.

This research also aims to investigate the influence of Bitcoin and gold prices on Ethereum prices. Bitcoin price refers to the cost of acquiring 1 BTC (Bitcoin), and historically, Ethereum prices have often exhibited a correlated movement with Bitcoinprices. Gold price represents the cost of acquiring gold, and this variable is chosen forcomparison as Ethereum is frequently likenedto gold, being considered a commodity and sought after as an investment alternative (Bouoiyour & Selmi, 2016).

Olivea Angela (2021) argues that world gold prices do not significantly impact Ethereum prices, suggesting a lack of volatility similar to other commodities. Conversely, altcoin prices, represented by Bitcoin, Litecoin, and Monero, demonstrate a substantial influence on Ethereum prices. The number of active wallets, reflecting the daily wallet addresses engagingin transactions on the Ethereum network (etherscan.io), is another critical variable. It plays a pivotal role in influencing crypto assetprices, providing insights into whether a coinis in an overbought or oversold phase.However, Sukamulya & Cornelia OliviaSikora (2018) present contrasting findings,suggesting that demand, as measured by the number of active wallets, negatively affects crypto asset prices in both the short and long term, specifically in the case of Bitcoin.

RESEARCH METHODS

The data utilized in this study cover Ethereum prices (HETH), total Ethereum

(TETH), number of transactions (JT), cost pertransaction (BPT), number of active wallets (JDA), Bitcoin prices (HBTC), and gold prices (HM). The data spans from December 31, 2016, to December 31, 2021, consideringweekdays only. The sampling techniqueemployed for data collection is purposive sampling, a method of sample selection basedon specific criteria. The criteria applied in thisstudy involve the period characterized by a significant increase in the value of Ethereum up to the end of 2021.

Each dataset is sourced from differentplatforms: etherscan.io for Ethereum-related data (ethereum price, total Ethereum, numberof transactions, cost per transaction, number of active wallets), blockchain.info for Bitcoinprices, and id.investing for gold prices.

The data analysis technique employedis the Error Correction Model (ECM). In this model, the dependent variable is Ethereum price, while the independent variables includetotal Ethereum, number of transactions, cost per transaction, number of active wallets, Bitcoin price, and gold price. The ECM is utilized to explore the relationships and dynamics among these variables, providing insights into how they collectively impactEthereum prices.

RESULT AND DISCUSSION

Stationary Test

The time series analysis requires data to be stationary, and unit root tests are employed to assess and prevent abrupt changes in the data. The results indicate that the probability values for the JT (X2) and JDA (X4) variables are below the 0.05 significance level. Consequently, the number of transactions and the number of active wallets are deemed stationary at the level of I(0), suggesting a lack of unit roots.

On the other hand, HETH (Y), TETH(X1), BPT (X3), HBTC (X5), and HM (X6) exhibit probability values exceeding 0.05. Consequently, the Ethereum price variable, total Ethereum, cost per transaction, Bitcoin price, and gold price are considered non- stationary at the I(0) level. This implies the presence of unit roots, signifying potentialchallenges in time series analysis due to the non-stationarity of these variables.

Integration Degree Test

The utilization of non-stationary data necessitates specialized treatment to mitigate the risk of spurious regression, where an estimated regression equation may exhibit seemingly good significance but lacks meaningful interpretation. In this study, the research variables, including Ethereum Price (HETH), Total Ethereum (TETH), Number of Transactions (JT), Cost Per Transaction (BPT), Number of Active Wallets (JDA), Bitcoin Price (HBTC), and Gold Price (HM),initially showed non-stationarity at the level of I(0).

To address this, the data underwent differencing once to test for stationarity. The results revealed that the significance values for all variables were below the 0.05 significance level at the first differencing degree. As a result, the null hypothesis of the presence of a unit root was rejected, indicatingthat the research variables became stationary at the first degree of integration. This transformation ensures that the data is suitablefor further time series analysis, helping to avoid spurious regression and enhance the meaningfulness of the estimated regression equations.

Cointegration Test

The cointegration test assesses whether a long-term relationship exists between the independent variables and thedependent variable. Its objective is to determine whether the residuals areintegrated, indicating a stable long-term relationship. In this study, the results indicated a probability value of 0.0004, whichis less than the significance level of 0.05. This

outcome suggests that the equation under examination exhibits a cointegrating relationship in the long run. Therefore, there is evidence of a stable and statistically significant long-term relationship between thevariables involved in the analysis.

Normality Test

The outcomes of the normality test, conducted using the Normal Probability Plot, reveal that the data follows a normal distribution, evident from the points closely aligning with the diagonal line. In the context of a Normal Probability Plot, if the residual data distribution is normal, the line representing the actual data will closely adhere to the diagonal line. Consequently, it can be concluded that the model is fitting or good, and it is reasonable to assert that the distribution of the residual data is normal.This outcome is indicative of theappropriateness of the model for the given dataset.

Multicollinearity

Multicollinearity testing in theregression model involves examining the Variance Inflation Factor (VIF) Tolerance values obtained from the regression output. When the VIF value exceeds ten or the tolerance falls below 0.1, it indicates the presence of multicollinearity symptoms in theregression model.

Upon analysis, the results revealed that none of the Centered VIF values for the existing variables surpassed 10. This suggeststhat there is no evidence of multicollinearity or a significant relationship between the independent variables in the regression model. The absence of high VIF values or low tolerance values supports the conclusion that multicollinearity issues are not present in the model, indicating a reliable and stable regression analysis.

Autocorrelation

Autocorrelation testing was conductedusing the Lagrange Multiplier Test (LM Test), with the hypothesis that if the ObsR-squared value exceeds the significance level ($\alpha = 0.05$), it suggests the absence of autocorrelation in the model. The results indicated that the ObsR-squared value was 3.470604 with a corresponding probability of0.1763. Given that the probability value is greater than 0.05, it leads to the conclusion that there is no autocorrelation present in the model. In other words, the test results suggestthat the residuals do not exhibit a systematic pattern of correlation over time, supporting the reliability of the regression model.

Heteroscedasticity

The results of the heteroscedasticity test employing the Harvey Heteroscedasticity test revealed an ObsR-squared value of60.54445 with a corresponding probability of0.0000. Since the ObsR-squared value exceeds the significance level ($\alpha = 0.05$), it leads to the conclusion that there is no evidence of heteroscedasticity in the model. In other words, the test results suggest that thevariance of the residuals is constant across all levels of the independent variables, supporting the assumption of homoscedasticity in the regression model.

Regression Analysis Results

The output from the Ordinary Least Squares (OLS) regression analysis revealed that the probability values for the variables TETH, JT,BPT, JDA, HBTC, and HM were all 0.0000, leading to the following regression equation:

HETH = 52.57730 – 2.761721TETH - 1.071556JT + 0.304542BPT + 1.400582JDA + 0.621058HBTC – 0.591422 HM.

The regression results also indicated a relatively high Adjusted R-squared value of 0.955063, alongside a relatively low Dubin- Watson (D/W) statistic of 0.188397. A high Adjusted R-squared value coupled with a low D/W statistical value is suggestive of a potential issue of spurious regression.

To address the risk of spurious regression, an Error Correction Model (ECM) correction was applied. The ECM regression equation took the form:

D(HETH) = 0.001290 – 0.501061D(TETH)
– 0.040508D(JT) + 0.021693D(BPT) + 0.069726D(JDA) + 0.920086D(HBTC) + 0.148353D (HM).

In the ECM regression analysis, the probability values for the variables were found to be 0.4980 for HETH, 0.0128 for JT, 0.0000 for BPT, 0.0000 for JDA, 0.000 for HBTC, and 0.1906 for HM. Additionally, the probability for ECT(-1) or Error Correction Term (ECT) was 0.0000, with a coefficient value of -0.0016152. The negative ECT coefficient, with an absolute value less than 1, indicates the validity of the ECM model specification.

The results of the F-test, assessing the collective impact of all independent variables, showed a significant effect F-count = 272.938 > F-table = 2.01 on Ethereum price (HETH). This suggests that total Ethereum (TETH), number of transactions (JT), cost per transaction (BPT), number of active wallets (JDA), Bitcoin price (HBTC), and gold price (HM) collectively have a significant impact on Ethereum price.

Furthermore, the t-test results for the individual independent variables in the ECM model indicated that four out of the six variables had significance levels below 0.05. This implies that only four variables individually have a significant short-term effect on Ethereum price. However, in the long term, all six variables were found to have a significant impact on the price of Ethereum, as indicated by their significance levels below 0.05 in the OLS model.

Table 2. Research Variable Stationarity Test Results

Variabel	Intercept	Trend and Intercept	None
HETH	-2.351139	-2.226120	1.931067
TETH	-2.417527	-2.655733	5.510214
JT	-4.046465***	-3.591767**	1.784610
BPT	-1.439951	-2.095072	-1.756934*
JDA	-3.899802***	-3.448447**	1.579696
HBTC	-1.528873	-1.946440	1.917193
HM	-1.148172	-2.169064	1.400958

Source: Output Eviews 10
Description: * stationary on significance 0.10
** stationary on significance 0.05
*** stationary on significance 0.01

Table 3. First Degree of Integration Test Results

Variabel	Intercept	Trend and Intercept	None
HETH	-45.06874***	-45.08385***	-44.91958***
TETH	-43.41626***	-43.50149***	-42.70831***
JT	-9.289026***	-9.570447***	-9.061468***
BPT	-24.43794***	-24.43122***	-24.39480***
JDA	-11.18499***	-11.35975***	-11.02998***
HBTC	-45.30500***	-45.30125***	-45.20259***
HM	-47.28093***	-47.26911***	-47.24595***

Source: Output Eviews 10
Description: * stationary on significance 0.10
** stationary on significance 0.05
*** stationary on significance 0.01

Table 4. Cointegration Test Results

ECT	t-Statistic	Prob
Argumented Dickey-Fuller test statistic	-4.345489	0.0004

Sumber: Output Eviews 10

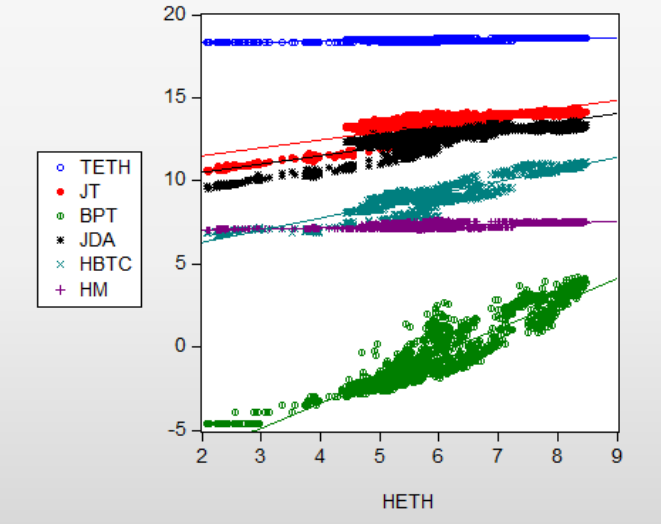

Figure 4. PP Plot Normality Test

Source: Output Eviews 10

Table 5. Multicollinearity Test Results

Variable	Centered VIF
D(TETH)	1.001183
D(JT)	2.231836
D(BPT)	1.074627
D(JDA)	2.227685
D(HBTC)	1.016510
D(HM)	1.009683
ECT(-1)	1.041840
C	NA

Source: Output Eviews 10

Table 6. Heteroscedasticity Test Results

Heteroscedasticity Test: Harvey			
F-statistic	8.906629	Prob. F	0.0000
Obs*R-squared	60.54445	Prob. Chi-Square	0.0000

Source: Output Eviews 10

Table 7. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.729085	Prob. F	0.1777
Obs*R-squared	3.470604	Prob. Chi-Square	0.1763

Source: Output Eviews 10

Table 8. Results of Analysis with the OLS Method

Variabel	Coefficient		Std. Error	t-Statistic	Prob
TETH	-2.761721		0.233571	-11.82392	0.0000
JT	-1.071556		0.077331	-13.85676	0.0000
BPT	0.304542		0.008130	37.46044	0.0000
JDA	1.400582		0.021584	19.20658	0.0000
HBTC	0.621058		0.096143	28.77418	0.0000
HM	-0.591422		-6.151489	-6.151489	0.0000
C	52.57730		3.757978	13.99085	0.0000
R-squared	=	0.955211			
Adjusted R-squared	=	0.955063			
F-statistic	=	6469.100			
Prob (F-statistic)	=	0.000000			
Durbit-watson stat	=	0.188397			

Source: Output Eviews 10

Table 9. Results of Analysis with ECM Technique

Variabel	Coefficient		Std. Error	t-Statistic	Prob
D(TETH)	-0.501061		0.739222	-0.677823	0.4980
D(JT)	-0.040508		0.016256	-2.491896	0.0128
D(BPT)	0.021693		0.003315	6.544699	0.0000
D(JDA)	0.069726		0.014594	4.777615	0.0000
D(HBTC)	0.920086		0.022004	41.81386	0.0000
D(HM)	0.148353		0.113296	-6.151489	0.1906
ECT(-1)	-0.016152		0.003492	-4.625123	0.0000
C	0.001290		0.000949	1.359761	0.1741
R-squared	=	0.512414			
Adjusted R-squared	=	0.510536			
F-statistic	=	272.9386			
Prob (F-statistic)	=	0.000000			
Durbit-watson stat	=	1.914536			

Source: Output Eviews 10

Discussion

The study results indicate that in the short-term Error Correction Model (ECM)equation, the constant has a positive value of 0.0019. The probability values for the variables are as follows: 0.4980 for TETH, 0.0128 for JT, 0.0000 for BPT, 0.0000 for JDA, 0.0000 for HBTC, and 0.1906 for HM.

The ECM analysis also yields an Error Correction Term (ECT) of -0.016152 with a probability value of 0.0000. The negative ECT value signifies an adjustment to short- term instabilities, indicating a balanceadjustment between the variables TETH, JT, BPT, JDA, HBTC, and HM to HETH in the short to long term.

The total Ethereum (TETH) isobserved to have a negative effect on the priceof Ethereum. This can be attributed to the design of Ethereum with an unlimited supply.Despite having an unlimited supply, Ethereum imposes a maximum supply limit of18 million ETH per year. According to the demand and supply theory, an increase in thesupply of Ethereum, coupled with constant demand, may lead to an accumulation of Ethereum, causing its price to decrease. Additionally, heightened competition among miners contributes to the increased difficulty in mining Ethereum.

The number of transactions has a significant negative effect on the price of Ethereum. This suggests that a high dailytransaction volume indicates potential price fluctuations in Ethereum. High transactionvolumes may lead to increased supply when prices are high and increased demand when prices are low. Moreover, a high number of transactions reflects a high level of publictrust in Ethereum, reinforcing its presence andvalue.

The cost per transaction has a positive

Conclusions and recommendations

Internal variables, including total Ethereum and the number of transactions, along with the external variable of the price ofgold, exhibit a negative influence on the priceof Ethereum. On the other hand, the cost pereffect on the price of Ethereum. This indicatesthat market prices for Ethereum are influenced by transaction costs. Higher transaction costs lead to higher Ethereum prices, while lower transaction costs may contribute to price decreases. The increased transaction fees are a result of higher transaction volumes, placing a greaterdemand on the Ethereum system, which incurs additional costs for miners.

The number of active wallets has a positive effect on the price of Ethereum. This is attributed to the primary function of digitalwallets in storing Ethereum. New users tend to choose well-known and trusted platforms like Ethereum, especially as they consider thesecurity of their digital assets. Additionally, the growing ecosystem with new coins built on the Ethereum network contributes to an increase in the number of active wallets.

The price of Bitcoin positively influences the price of Ethereum. Bitcoin's status as the largest, oldest, and most established crypto asset, along with its significant market dominance, plays a keyrole. In the past, traders had to exchange Ethereum for Bitcoin, and many traders and investors continue to hold assets in the form of Bitcoin. The success of Bitcoin often influences the price movements of other altcoins, including Ethereum.

Conversely, the price of gold shows anegative and insignificant effect on the price of Ethereum. Gold's relatively small daily price changes contrast with the higher volatility observed in Ethereum's short-term movements. Despite this, both gold and Ethereum can serve as alternative assets for asset protection during times of crisis in a country.

transaction and the number of active wallets, categorized as internal variables, and the priceof Bitcoin as an external variable, exert apositive influence on the price of Ethereum. Changes in Ethereum's price are expected to align with corresponding changes in thesethree variables. Ethereum is regarded akin to stocks, currency, and gold, representing valuable investment instruments or assets.

For future researchers, it is recommended to expand the range of researchvariables and explore additional factors that could impact Ethereum's price. Additionally, extending the research period and incorporating the latest data is advised. Given the Ethereum algorithm's transition from aproof-of-work system to a proof-of-stake system starting in 2022, this shift may potentially influence Ethereum's price. A more extended research period using up-to- date information is essential to present a current and comprehensive overview of Ethereum prices.

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