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DIGITAL TRANSFORMATIONS IMPRINT FINANCIAL CHALLENGES: ACCOUNTING ASSESSMENT OF CRYPTO ASSETS AND BUILDING RESILIENCE IN EMERGING INNOVATIVE BUSINESSES

Abstract. *This study analyses the evolution of the crypto asset market over the period 2014-2023 and addresses a series of issues relating to global crypto-assets regulations uniformity, the opportunity for companies to develop crypto-asset transactions, and the accounting reflection of these transactions that impacts the sustainable reporting. Working hypotheses are twofold: (a) crypto assets transactions present an increased investment risk and (b) there is mutual consensus on the accounting valuation of crypto assets. Robust economic analysis using ARCH, GARCH, TGARCH, and EGARCH models points to interesting conclusions on uncertainty and investment risk in these emerging technologies. The results are significant for business purposes and indicate that investments in ETH and USDT currencies can be classified as medium-risk investments. The impact of negative shocks (such as political instability, wars, pandemics, and other) on USDT can be verified, leading to more volatility in the currency.*

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JEL Classification: C12, C30, C58, D53, M40

1. Introduction

The growing interest in the trading of cryptocurrency has a profound impact on market transactions, supply chains, and individual behaviour, strengthening the framework for a new digital age. As the use of these digital assets becomes easier and more popular, more and more companies are using crypto assets as a means of payment or as an investment alternative. The expansion of cryptocurrencies poses many challenges for governments and sustainable development strategies around the world and leads to separate decisions on national regulation and bans. Although it is unclear what problems the cryptocurrency option could solve, the rapid global expansion of crypto-ecosystem trading has a strong political, social, economic, and environmental impact.

New digital transformations have brought about several important challenges in terms of building business resilience and community sustainability (Esmaeilian, 2020). Understanding and integrating sustainability principles in the digital age poses several challenges and requires careful consideration and analysis (Abad-Segura et al., 2021).

The research of cryptography has triggered various concerns over the years. Opportunities and challenges were identified in debates driven by the topic of cryptography (Dutta et al., 2020). The attitudes of governments towards new digital assets as a new technology led to the adoption of different regulations, which in certain cases are quick but completely unbalanced when viewed globally.

The unprecedented expansion speed of virtual currency transactions determined the authorities to clarify the definition of money, private money, or new virtual currency transactions that do not necessarily have direct quantification in conventional currencies. In the context of European directives, there is still no unanimous definition of cryptocurrencies accepted by all countries. The regulation and the accounting recognition of crypto assets is still under analysis and negotiation to achieve a general consensus (Shatalova et al., 2016), as well as the quantification of its fiscal impact (Taskinsoy, 2020). The large number of individual-level cryptographic transactions has led states to implement specific regulations establishing reporting and tax payment obligations on individuals, but classification of a specific source of tax income for tax treatment purposes remains under discussion (Afzal, 2019).

Recent studies have analysed the role of the trade price of crypto assets or the importance of mining behaviour in the evolution of blockchain.

Particular attention was paid to Bitcoin trading prices and on their impact on investors' interests (Urquhart et al., 2019).

Companies that use innovative currencies in transactions are interested in negotiations and struggle to understand how to recognise these innovative transactions for accounting and tax purposes. The question of divergent interpretations of the adequacy, legality, accounting, and tax regulations of crypto-trade concepts requires legislative reform and further clarification.

This study is based on the evolution of trading prices for several crypto currencies between 2014 and 2023. The focus is set on the study of uncertainty and risks of crypto asset yields and the uniformity or appropriateness of financial regulations across countries. The study provides readers with the opportunity to analyse investment uncertainty and risk and aims to help to formulate practical guidelines for investing decisions by companies with virtual investment potential.

The originality of this article was reinforced by a broader presentation of cryptocurrencies investment decisions, both from the point of view of uncertainty analysis in the decision-making process and from the point of view of the accounting impact of the use of cryptocurrencies in the business environment. Issues such as volatility and investment risks are complemented by statements on accounting treatment of recognition and the need for accurate representation of crypto assets in sustainable reporting.

2. Literature review

2.1. Building resilience in emerging innovative businesses

With regard to financial stability, digital currencies have received different valuations. On the one hand, there are studies that classify these assets as speculative assets, with high volatility and risk. Several studies highlight the potential of crypto investment to produce significant financial losses. Pagnotta (2022) investigates the atypical evolution of supply and demand in the cryptocurrency market, showing that it is wrong to assess that a decrease in the supply of Bitcoin would automatically lead to an increase in its value, as would happen in a regulated market.

In general, cryptocurrencies pose a challenge to governments and traditional financial institutions because they undermine their control and power over financial systems. Consequently, the political issue associated with cryptocurrencies may be a sensitive issue, causing intense debate in governments and parliaments and causing potential non-confidence requests from political leaders and parties (Stan & Vancea, 2014). While traditional currencies are traded within the framework of existing legislation, digital asset transactions do not benefit from public oversight and regulatory frameworks. Transactions are performed on the Internet, and transaction history is transmitted via distributed ledger technology. In this context, security breaches, fraud, hacking, credit, and liquidity risks challenge the operations.

Nowadays, individuals often choose to trade goods or services within and across borders using cryptocurrencies. In principle, transactions depend on trust in others, as the blockchain technology used does not always produce supporting documents capable of documenting certain transactions, unlike in the case of regulated assets transactions.

In view of the need for regulation and in order to temper the attraction for the crypto market, authorities are mainly developing information campaigns on the increasing risks associated with the use of digital currencies. Several analyses have been conducted to study the speculative nature of crypto assets (Yermack, 2015), putting these instruments in the category of inappropriate investments.

Despite public warnings from the authorities and research results on the risks associated with crypto assets, there are currently more than a thousand crypto currencies in circulation. Bitcoin is considered to be the most widely used virtual currency. Previous studies have shown that the evolution of the value of Bitcoin is influenced by the number of new users. The strong relationship between the price of BTC and the number of investors in the context of trading in unregulated markets encourages some to find similarity with pyramid schemes such as Ponzi pyramid schemes (Bartoletti et al., 2018). Although not directly identified with Ponzi schemes, there is still speculation about the potential for abuse of the unregulated market. In this context, the first research hypothesis is as follows:

Hypothesis 1 (H1) - Transactions with crypto assets present an increased operational and investment risk.

2.2. Accounting assessment of crypto assets

The assessment of the impact of cryptocurrency transactions or blockchain technology on accounting opened new paths to research. Some studies argue that blockchain technology may increase confidence in financial information as an alternative to current audit and accounting systems (Kokina et al., 2017). On the other hand, the potential to automate certain accounting operations is seen as a threat to accounting practices (Schmitz, 2019).

The current accounting regulations allow cryptocurrency to be recognised as assets or intangible properties under International Financial Reporting Standards (IFRS) (Chou et al., 2022). Crypto assets can be seen as a mix of currency and new technologies. In the past, there were no comparable benchmarks that could be used to pay for goods and services. Cryptographic technologies use encryption methods to secure transactions, and can be compared to jigsaw puzzles maintained by several independent players.

The trading system technology and block validation system aims to protect the information on a transaction. Cryptocurrencies also use distributed ledgers running on a distributed system (Kokina et al., 2017). The distributed ledger eliminates the intervention of a central authority or intermediary in processing, validating, or authenticating transactions. All transactions are performed in this distributed ledger and verify whether the currency is available to be paid from one party to another.

According to the potential treatment proposed by IAS 2, or equivalent national regulations implemented in states with a crypto transaction approval policy, the criteria for classifying crypto currencies into the inventory category are conditioned by the intention to sell the assets in the normal course of business activities (Morozova et al., 2020). The value of crypto currencies is based on the principle of entry cost, which includes all fees directly attributable to the acquisition.

Another way to account for crypto assets is to register them in the category of intangible assets, according to IAS 38 (Morozova et al., 2020). The accounting of cryptocurrencies as intangible assets aims to choose a valuation model between the revaluation model or the cost model. The revaluation model involves the recognition of assets with reduced depreciation for the situation where the fair value can be determined on the basis of an active market. The cost model consists of recognising crypto assets in the amount with fewer accumulated value adjustments.

Analysts found that cryptocurrency retaining is within the definition of a non-intangible asset in IAS 38, i.e., it can be separated from the holder and sold or transferred separately; and it does not grant the holder the right to receive a fixed or determinable number of monetary units.

The speculative nature of transactions can place cryptocurrencies in the category of current financial assets, while the use of cryptocurrencies as exchange units puts them in the category of liquid assets or cash. However, because the classification conditions under IAS 32 are not met, crypto asset classification in the financial asset category is not possible (Morozova et al. 2020).

More and more companies are turning to the use of crypto in their daily payment operations. Accounting has a major mediating role between the reflections of day-to-day operations and the measure for performance (Nassani et al., 2023). In this context, the need to expand research on accounting practices for crypto assets becomes imperative. Research must find valid answers on how to incorporate these assets into sustainable reports (Chou et al., 2022).

Hypothesis 2 (H2) - There is a mutual consensus on the accounting valuation of crypto assets and their sustainable reporting.

3. Research methodology

Analysis of the behaviour and development of financial markets has generated strong research interest from both macroeconomic and microeconomic perspectives. Financial markets may show periodicity or chaotic characteristics, and uncertainty poses several challenges in formulating financial forecasts (Yao et al.,2022). Given the growing utility of time series analysis in finance using ARCH and GARCH economic models (Viorica et al., 2022), this study analyses operational and investment risks in crypto asset trading using a combination of ARCH, GARCH, EGARCH and TGARCH economic models. In financial time series, the variation in errors is unlikely to be constant over time, so it is preferable to estimate models that do not assume that the variation is constant and can describe the evolution of the variation in errors. Financial time series very often show the phenomenon of volatility clustering that shows that the current level of variation tends to be positively related to the level of previous periods.

The analysis of crypto asset trades took into account monthly historical crypto exchange price data published by coinmarketcap.com and Kraken.com. The variables used in this study and the periods used in the analysis are represented by the following cryptocurrencies:

- Binance (NBB), monthly recorded data for the period August 2017 – March 2023,
- Bitcoin (BTC), monthly recorded data for the period October 2014 – March 2023,
- EGLD, data recorded monthly for the period October 2020 - March 2023,
- Ethereum (ETH), monthly data for the period September 2015 – March 2023,
- Tether (USDT), monthly data for the period March 2015 - March 2023,
- XRP, monthly recorded data for the period October 2014 - March 2023.

To model the economic series that exhibit these characteristics, ARCH and GARCH models were developed, which also take into account conditional variations.

4. Results and Discussions

4.1. Evolution of the crypto assets market during 2014-2023

In order to mitigate the nonstationarity of the original time series and to make the results of the analysis conclusive, the data series were transformed into monthly logarithmic return series:

$$R_t = \log(P_t/P_{t-1}), \quad (1)$$

where R_t is the yield at time t;

P_t = the value of the cryptocurrency at time t;

P_{t-1} = the value of the cryptocurrency at time t-1

The evolution of the series of monthly logarithmic returns of the analysed cryptocurrencies is reflected in Figure 1, by the time durations for which they could be collected for each asset.

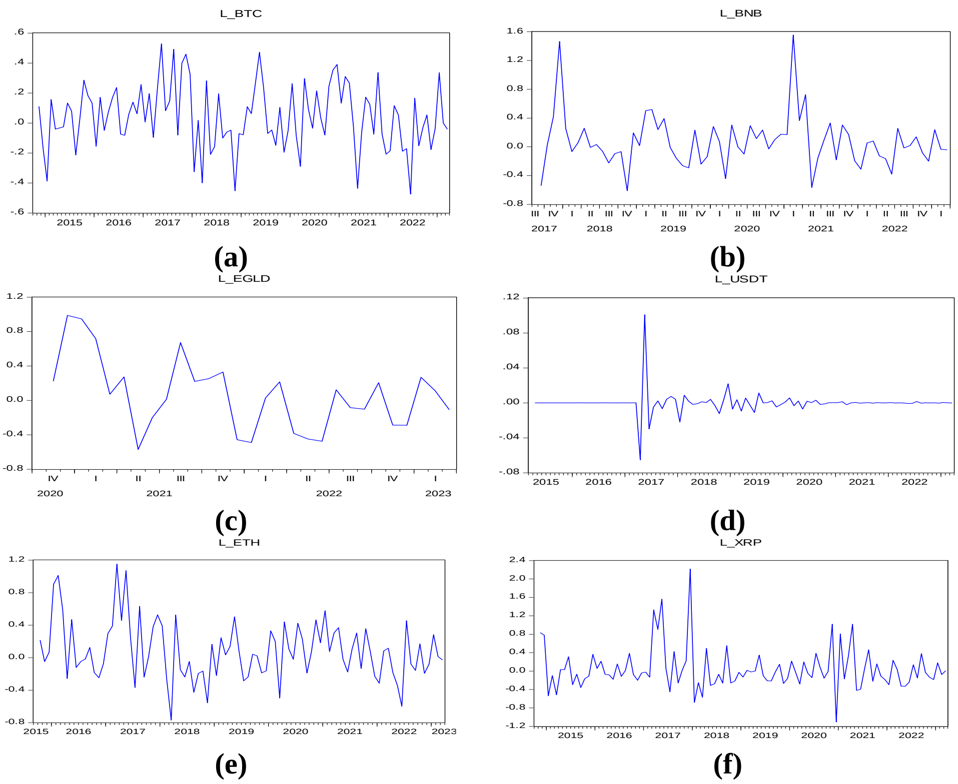


Figure 1. Evolution of monthly cryptocurrency yields (logarithmic series): (a) BTC; (b) BNB; (c) EGLD; (d) USDT; (e) ETH; (f) XRP

Source: authors' results

The first step in the proposed research was to test the integration order. Integration order testing aims to determine whether a time series is stationary or not or, more precisely, what the integration order of the time series is.

Among the numerical methods for time series stationarity testing, we used the Augmented Dickey-Fuller test and the Phillips-Perron test. These tests aim to determine whether a time series has a unit root, which suggests that the time series is integrated of order 1 (i.e. it must be derived once to become stationary). If tests fail to reject the hypothesis that the time series has a unit root, the stationarity of the first-difference time series is tested.

Time-series stationarity testing

In the first part of the study, we test the stationarity of the time series using augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The summary results of the ADF and PP tests are highlighted in Table 1.

Table 1. Time-series stationarity tests results

Logarithmic variable	Augmented Dickey-Fuller test values		Phillips-Perron test values	
	t-statistic	Prob.	t-statistic	Prob.
BTC	-8.564	0.000	-8.665	0.000
BNB	-6.794	0.000	-6.794	0.000
EGLD	-3.029	0.044	-2.844	0.006
USDT	-8.808	0.000	-85.134	0.000
ETH	-7.585	0.000	-7.686	0.000
XRP	-10.654	0.000	-10.686	0.000

Source: authors' results

According to Table 1, the series of logarithmic cryptocurrency returns are stationary (the probability of the t-Student test is below the 5% significance threshold).

4.2. Reflections on business innovative trends

To validate or invalidate hypothesis H1 of the study, we consider the following aspects:

- Testing the stationarity of the analysed time series;
- Checking for the presence of ARCH effects to know which models require estimation using this method;
- Testing the validity of the heteroskedastic models.

Before estimating ARCH models, it is important to check for the presence of ARCH effects in order to know which models require estimation using this method.

As shown in Table 2, the probability value associated with the Chi-square test is less than 0.05 (thus rejecting the hypothesis of homoskedasticity of errors with 95% probability) only for the ETH and USDT series.

Table 2. ARCH test for the crypto assets yield series

Heteroskedasticity test: ARCH			
Crypto asset: **BNB**			
F-statistic	0.159981	Prob. F(1,63)	0.6905
Obs*R-squared	0.164641	Prob. Chi-Square(1)	0.6849
Crypto asset: **BTC**			

Heteroskedasticity test: ARCH			
Crypto asset: **BNB**			
F-statistic	0.269717	Prob. F(1,97)	0.6047
Obs*R-squared	0.274515	Prob. Chi-Square(1)	0.6003
Crypto asset: **EGLD**			
F-statistic	0.494500	Prob. F(1,25)	0.4884
Obs*R-squared	0.523702	Prob. Chi-Square(1)	0.4693
Crypto asset: **ETH**			
F-statistic	3.502552	Prob. F(2,84)	0.0346
Obs*R-squared	6.696811	Prob. Chi-Square(2)	0.0351
Crypto asset: **USDT**			
F-statistic	5.837522	Prob. F(1,92)	0.0177
Obs*R-squared	5.608555	Prob. Chi-Square(1)	0.0179
Crypto asset: **XRP**			
Heteroskedasticity test: ARCH			
Crypto asset: **XRP**			
F-statistic	1.462205	Prob. F(1,97)	0.2295
Obs*R-squared	1.470191	Prob. Chi-Square(1)	0.2253

Source: authors' results

The BNB, BTC, EGLD, and XPR series do not show ARCH effects. This suggests that the variance of their errors is not affected by previous fluctuations in the data. This property may be important in time-series analysis as it may suggest that the variance of errors is constant. The absence of the ARCH effect may indicate a state of stability and predictability of the data, which may be important for investment and risk management decisions.

4.3. Volatility estimation using conditional variance

To estimate the conditional variance as a measure of the volatility of the variables considered in the analysis, we constructed five heteroscedastic models, namely: ARCH(1), ARCH(2), GARCH(1,1), TGARCH (1,1), EGARCH (1,1).

4.3.1. Estimation of heteroscedastic models and criteria for choosing the optimal model

At this stage, by comparing the values indicated by the Akaike (AIC), Bayesian (BIC or Schwarz) or Hannan-Quinn (HQ) information criteria, the model whose values are minimum is chosen.

Table 3. Information criteria values for ETH estimated models

	ARCH (1)	**ARCH(2)**	**GARCH(1,1)**	**TGARCH (1,1)**	EGARCH (1,1)
AIC	0.815	0.805	0.811	0.826	0.746
SC	0.956	0.974	0.979	1.023	0.943
HQC	0.872	0.873	0.879	0.905	0.825

Source: authors' results

According to the information criteria presented in Table 3, the most robust for volatility estimation is the EGARCH model (1,1).

Sample (adjusted): 2015M12 2023M03
Included observations: 88 after adjustments
Convergence achieved after 29 iterations
MA Backcast: 2015M10 2015M11
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(4) + C(5)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(6)
*RESID(-1)/@SQRT(GARCH(-1)) + C(7)*LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.040240	0.037251	1.080238	0.2800
AR(2)	-0.900766	0.032713	-27.53535	0.0000
MA(2)	0.989825	0.014602	67.78829	0.0000
Variance Equation				
C(4)	-1.614923	0.638071	-2.530947	0.0114
C(5)	0.652926	0.320368	2.038049	0.0415
C(6)	0.195781	0.175314	1.116746	0.2641
C(7)	0.524255	0.296704	1.766933	0.0772

R-squared	0.053184	Mean dependent var	0.085106
Adjusted R-squared	0.030906	S.D. dependent var	0.361347
S.E. of regression	0.355719	Akaike info criterion	0.746218
Sum squared resid	10.75557	Schwarz criterion	0.943279
Log likelihood	-25.83360	Hannan-Quinn criter.	0.825609
Durbin-Watson stat	1.575954		

(a)

Sample (adjusted): 2015M05 2023M03
Included observations: 95 after adjustments
Convergence achieved after 118 iterations
MA Backcast: OFF (Roots of MA process too large)
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(4) + C(5)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(6)
*RESID(-1)/@SQRT(GARCH(-1)) + C(7)*LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-5.11E-06	1.97E-05	-0.259598	0.7952
AR(1)	-0.004340	0.129838	-0.033428	0.9733
MA(1)	-1.044778	0.055951	-18.67313	0.0000
Variance Equation				
C(4)	-8.950446	3.304172	-2.708832	0.0068
C(5)	-0.284041	0.203930	-1.392835	0.1637
C(6)	-0.534105	0.137290	-3.890350	0.0001
C(7)	0.061220	0.346090	0.176889	0.8596

R-squared	0.618947	Mean dependent var	1.37E-07
Adjusted R-squared	0.610663	S.D. dependent var	0.013571
S.E. of regression	0.008468	Akaike info criterion	-6.782808
Sum squared resid	0.006597	Schwarz criterion	-6.594628
Log likelihood	329.1834	Hannan-Quinn criter.	-6.706769
Durbin-Watson stat	2.497375		

Inverted AR Roots -.00
Inverted MA Roots 1.04
Estimated MA process is noninvertible

(b)

Figure 2. EGARCH (1,1) model estimation for: (a) ETH; (b) USDT
Source: authors' results

The variance equation is as follows:

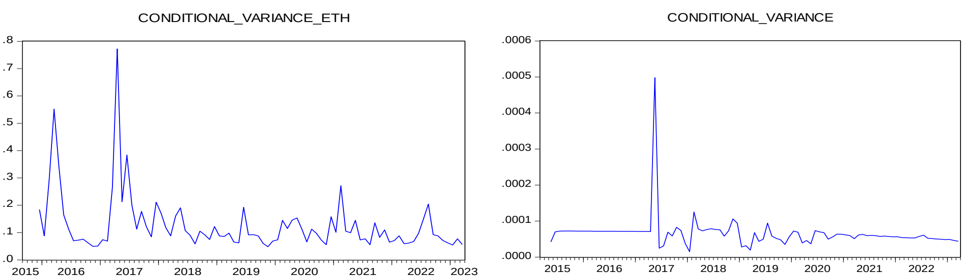
$$\log(h_t) = -1.614 + 0.652\left|\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right| + 0.195\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + 0.524\log(h_{t-1}) \quad (2)$$

According to Figure 2(a), the effects of ARCH (in equation coefficient C(5) and GARCH (coefficient C(7)) are statistically significant, indicating the persistence of past shocks on volatility. According to the above equation, the speed of adjustment of the volatility of the ETH cryptocurrency return to a market shock is 0.65 and the persistence of the shock has the value of 0.52. The closer the coefficient of the conditional variance is to 1, the more persistent are the shocks to the conditional variance. The results indicate a persistence of the shocks and the speed of adjustment of the medium-intensity volatility.

The persistence of past shocks on volatility suggests that the effects of past shocks on the volatility of a time series have a longer duration over time than would normally be expected. This may indicate that the volatility of the time series has a tendency to remain at high or low levels for a longer period of time than would normally be expected.

This persistence can be important in financial analysis, as it suggests that the volatility of a time series will remain at high or low levels for the foreseeable future. This can influence investment decisions and risk management strategies, as investors and asset managers may want to adjust their portfolios to take this persistence into account.

However, the equation did not show leverage. The coefficient C(6) is positive, but not statistically significant. Therefore, the skewness effect is not obvious. This absence of leverage may be significant in the context of financial analysis, as it may indicate greater stability of the cryptocurrency and less possibility of major losses due to price fluctuations. It may also suggest that there are no trading opportunities based on this leverage, which may be important for investors looking to take advantage of such fluctuations.



(a) **(b)**

Figure 3. Evolution of volatility of: (a) ETH series; (b) USDT series

Source: authors' results

Figure 3(a) shows the volatility of the returns of the cryptocurrency ETH based on the estimated model.

Table 4. Information criteria values for estimated models for USDT

	ARCH (1)	ARCH(2)	GARCH(1,1)	TGARCH (1,1)	EGARCH (1,1)
AIC	-6.779	-6.739	-6.756	-6.765	**-6.782**
SC	-6.644	-6.578	-6.595	-6.577	**-6.594**
HQC	-6.724	-6.674	-6.691	-6.689	**-6.706**

Source: authors' results

For the series of logarithmic monthly returns of USDT, according to the Akaike, Schwarz, Hannan-Quinn criteria, the optimal model for volatility estimation is the EGARCH (1,1) model, according to Figure 4 and Table 4. The variance equation is as follows:

$$\log(h_t) = -8.950 - 0.284 \left|\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right| - 0.534\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + 0.061 \log(h_{t-1}) \tag{3}$$

According to the calculations in Figure 2(b), the skewness term is -0.534 (negative), suggesting the that the volatility of USDT increases more after negative shocks. The impact of positive shocks is smaller on the variable analysed.

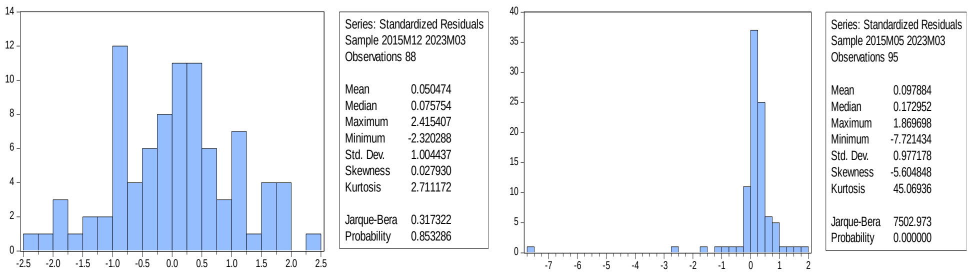
Figure 3(b) shows the volatility of the USDT cryptocurrency based on the estimated model. The USDT cryptocurrency is the most stable currency (with low volatility of returns) among all analysed cryptocurrencies, being linked to the evolution of the US dollar (USD). The attachment to a traditional currency, often backed by collateral reserves made up entirely or largely of the fixed currency, ensures that stablecoins are not subject to the same price volatility as more speculative cryptocurrencies.

4.3.2. Testing the validity of heteroscedastic models

The estimated statistical models are subjected to validation tests. At this stage, the assumptions for the error variable in the model are tested: errors to be normally distributed, homoscedasticity of errors, uncorrelation of errors.

a. Testing the hypothesis of normality of errors.

Testing the normality of the residual variable is performed both graphically (histogram of errors) and using the Jarque-Bera test, as shown in Figure 4.



(a) **(b)**

Figure 4. Error histogram for the EGARCH (1,1): (a) ETH model; (b) USDT model

Source: authors' results

The associated test probability is greater than 0.05, indicating that the residual terms exhibit a normal distribution in the ETH case, according to Figure 4 (a). The associated test probability is less than 0.05, indicating that the residual terms do not exhibit a normal distribution in the case of USDT, as shown in Figure 4 (b).

Although the normality assumption is violated for this model, we can consider that for large data series, the assumption of normality of errors is asymptotically satisfied.

b. Testing the homoskedasticity hypothesis

The hypotheses tested for homoskedasticity are whether: (H_0) ETH and USDT have no ARCH effects, or (H_1) ETH and USDT have ARCH effects.

Table 5. ARCH Test for the EGARCH (1,1) model estimated for ETH and USDT

Heteroskedasticity test: ARCH			
Crypto asset: **ETH**			
F-statistic	0.056549	Prob. F(1,85)	0.8126
Obs*R-squared	0.057841	Prob. Chi-Square(1)	0.8099
Crypto asset: **USDT**			
F-statistic	0.043057	Prob. F(1,92)	0.8361
Obs*R-squared	0.043972	Prob. Chi-Square(1)	0.8339

Source: authors' results

According to the ARCH test results shown in Table 5, the null hypothesis is accepted with a 95% probability. The probability of the test is higher than the significance threshold, resulting in the acceptance of the null hypothesis that there are no ARCH effects at the level of residual values.

4.4. Discussions on the challenges regarding the accounting valuation of crypto assets

The retrospective evolution of the use and regulation of crypto assets transactions is characterised by dynamism, interesting government attitudes, and a wide range of questions relating to the accounting impact of transactions (Demirkan et al., 2020). Some countries have set up regulatory safeguards by integrating cryptocurrency transactions into legal provisions, others have introduced certain legal embargoes or conditions, while others have banned cryptocurrency transactions.

The cryptography system does not allow full control of the beneficiaries on trading accounts, but amplifies the role of platforms (Cong et al., 2021) that may impose trading limits on quantities expressed in conventional currencies that can be mined. The simple conversion that takes place within a crypto trading platform is not implicitly followed by the realisation of the real benefit of the conversion price (Coyne and McMickle, 2017), until the funds are traded in the holder's conventional bank account (i.e., until the transaction is converted to a fiat currency). In this regard, the results of this study are consistent with previous analyses, showing that it is not clear what the financial value (Morozova et al., 2019) of a transaction can be expressed, nor is the correct time for the application of tax.

Similar to previous studies, this analysis shows that BTC volatility does not create confidence that transactions at various stages of trading are properly reflected (Yermack, 2015), allowing interested decision makers to pursue financial objectives and achieve viable benefits. The transparency of transactions provided by the use of distributed ledgers can reduce the interest of some potential investors (Hellani et al., 2021). The complexity of trading platforms poses a number of difficulties. Such difficulties concern understanding and determining the income tax obligations to be reported on crypto asset transactions, tax residency, or compliance with reporting obligations regarding the time period of the eventual tax due. Since conventional tax income determination systems rely on supporting documentation to establish the tax base, the legislation is still not very clear, in a uniform way, where such transactions are regulated, and neither supporting documents can prove the tax base for the correct and timely application of an appropriate tax rate.

5. Conclusions

The expansive attraction for crypto asset transactions, both among individuals and in particular among companies, combined with the current under-regulated status of the emerging digital market, pose a threat to the sustainable development of communities. Even if different trends are observed in the evolution of prices for various virtual assets, they can be considered normal under market conditions. We believe that our results can help to better understand how investment options in the crypto market can be formed.

With regard to the hypothesis H1 of the study, concerning the analysis of the operational and investment risks in the cryptos included in the sample, only two currencies showed ARCH effects: ETH and USDT. In other words, because the evolution of ETH and USDT is volatile, unstable, and unpredictable. This can be important for investment and risk management decisions. The other four currencies that do not exhibit ARCH effects show that their evolution is not influenced by previous data fluctuations.

The absence of ARCH indicates a lack of volatility, meaning that its evolution is not influenced by unknown political and economic events, but requires further research into the motivation for investment evolution. To test investment risk, GARCH testing can only be applied to currencies with ARCH effects, i.e. ETH and USDT. The results indicate the persistence of the average intensity shock and volatility adjustment rate.

The results show that investing in cryptocurrencies such as ETH and USDT does not pose a significant long-term investment risk, but can be classified as medium risk investment. At the same time, it could be verified that the impact of negative shocks (e.g., political instability, war, epidemics, etc.) on USDT could be higher and can lead to greater volatility of this currency.

The integration of innovative products into market offers and the clear presentation of market conditions to customers are particularly important to ensure that supply and demand are correctly assessed at the level of enterprises with investment potential. From this point of view, the need to regulate transactions with virtual assets concerns both the state and companies as a compulsory part of the fight against financial crime, the prevention of money laundering, or the internal control mechanisms for financial risks (Smith, 2020). The rapid development of innovative asset transactions poses several challenges, such as how to reflect them in accounts or their impact on sustainable reporting. The increased energy consumption caused by the use of crypto assets (Huynh, 2022) cannot be attributed to specific reporting entities. The H2 hypothesis of the study regarding the accounting reflection and sustainable reporting of crypto transactions still identifies an inhomogeneous global context for understanding and regulating crypto assets.

The limitations of research are mainly due to the increasing dynamism of technology and trading volume of these assets. Although the amount of information about cryptocurrencies is large, the possibility of analysing geopolitical transactions is still cumbersome and often depends on individual willingness to report on cryptocurrency transactions. Furthermore, since this is a decentralised market, there are sometimes discrepancies between the trading prices published on different platforms for information or trade purposes. These research limitations also represent new paths of research that can improve the understanding of transactions with emerging technologies and contribute to community benefits.

Managers with various initiatives in emerging innovative markets can use this study to find important information to help them assess risks and make investment decisions in cryptocurrencies. The analysis of investment risks is complemented by interesting statements on how to record accounting information and helps to better understand the importance of accuracy in sustainable reporting.

The widespread market presence of crypto assets supports the need for further research on the impact of these types of assets and their regulation in the context of sustainable reporting and resilience to community economic development.

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