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Persistence in the Cryptocurrency Market:

The Impact of the Covid-19 Pandemic and of the  
Russia-Ukraine War

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**Persistence in the Cryptocurrency Market:  
The Impact of the Covid-19 Pandemic and of the Russia-Ukraine War**

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## **1. Introduction**

The cryptocurrency market has developed significantly since the launch of Bitcoin in January 2009, thereby providing new investment opportunities to agents. One important issue is the extent to which it can be characterised as an efficient market, which requires prices to follow a random walk and thus to be unpredictable. Whilst numerous studies have analysed persistence of other asset prices (see, e.g., Mills, 1993; Barkoulas & Baum, 1996; Jacobsen, 1996; Caporale and Gil-Alana, 2004; Caporale et al., 2016), the evidence concerning the cryptocurrency market is more limited. The most extensive study on this topic is due to Caporale et al. (2018), who found time-varying persistence in Bitcoin, Litecoin, Wave, and Run over the period 2013-2017, whilst Caporale and Plastun (2019) detected an anomaly in the case of Bitcoin, which appears to have higher returns on Mondays than on the other days of the week.

The aim of the present paper is to investigate the possible impact on the cryptocurrency market of two most recent exogenous shocks that have affected the world economy, namely the Covid-19 pandemic and the Russia-Ukraine war. Although a few existing studies have already examined this issue (see, e.g., Sabrine et al., 2022; Khalfaoui et al., 2023; Lahmiri, 2023; Theiri et al., 2023), ours considers a wider set of cryptocurrencies and uses a more general and flexible modelling approach. More specifically, our analysis is carried out for the five cryptocurrencies with the highest degree of market capitalisation (Bitcoin, Ethereum, Tether, BNB and USD Coin) using fractional integration methods that are informative about the long-memory, mean reversion and persistence properties of the series of interest. Estimates of the fractional differencing parameter measuring the degree of persistence are obtained first for the period ending in December 2019; then the sample is extended to December 2021 to examine the possible impact of the Covid-



cryptocurrencies and found considerable heterogeneity across these markets. Finally, Arouxet et al. (2022) reported that the Covid-19 pandemic had only a slight impact on the long-memory properties of both the returns and volatility of seven cryptocurrencies.

### **3. Empirical Analysis**

The present study uses daily data on the five cryptocurrencies with the highest









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**Table 1: Capitalisation in the cryptocurrency market (25.04.2023)**

# Name

**Table 2: Estimates of d for the sample ending in December 2019**

Series	No terms	An intercept	An intercept and a time trend
Bitcoin	0.97 (0.93, 1.02)	<b>1.04 (1.00, 1.08)</b>	1.04 (1.00, 1.08)
BNB	1.07 (0.99, 1.18)	<b>1.14 (1.06, 1.23)</b>	1.14 (1.06, 1.22)
Ethereum	1.04 (0.99, 1.09)	<b>1.02 (0.98, 1.07)</b>	1.02 (0.98, 1.07)
Tether	-0.09 (-0.13, -0.06)	-0.09 (-0.13, -0.06)	<b>-0.11 (-0.15, -0.08)</b>
USD Coin	0.57 (0.48, 0.67)	<b>0.52 (0.43, 0.63)</b>	0.50 (0.41, 0.63)
Estimated coefficients in the selected models:			

Series	d	Intercept	Intercept an
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**Table 3: Estimates of d with data ending at December 2021**

Series	No terms	An intercept	An intercept and a time trend
Bitcoin	0.98 (0.95, 1.01)	1.04 (1.01, 1.09)	<b>1.04 (1.01, 1.09)</b>
BNB	1.10 (1.03, 1.17)	<b>1.15 (1.09, 1.22)</b>	1.15 (1.09, 1.21)
Ethereum	1.04 (1.00, 1.09)	1.03 (0.99, 1.08)	<b>1.03 (0.99, 1.08)</b>
Tether	-0.08 (-0.11, -0.05)	-0.08 (-0.11, -0.05)	<b>-0.09 (-0.12, -0.05)</b>
USD Coin	0.58 (0.53, 0.66)	<b>0.56 (0.48, 0.64)</b>	0.55 (0.49, 0.64)
Estimated coefficients in the selected models:			
Series	d	Intercept	Intercept and time trend
Bitcoin	1.04 (1.01, 1.09)	4.8991 (115.99)	0.0018 (1.76)
BNB	1.15 (1.09, 1.22)	-2.2152 (-31.51)	---
Ethereum	1.03 (0.99, 1.08)	10.260 (14.98)	0.0030 (1.68)
Tether	-0.09 (-0.12, -0.05)	-0.00116 (-3.52)	0.0000011 (5.01)
USD Coin	0.56 (0.48, 0.64)	0.00597 (2.26)	---

Note: values in parenthesis in the upper panel are the 95% confidence intervals for the estimates of the differencing parameter. In bold, the estimates from the selected models. In the lower panel, in parenthesis in column 3 and 4, the



**Table 5: Summary of the Results**

<b>Series</b>	<b>Pre-Covid-19</b>	<b>Covid-19</b>	<b>Russia-Ukraine war</b>
<b>Bitcoin</b>	1.04 (1.00, 1.08)	1.04 (1.01, 1.09)	1.03 (0.99, 1.07) <sup>-</sup>
<b>BNB</b>	1.14 (1.06, 1.23)	1.15 (1.09, 1.22) <sup>+</sup>	1.15 (1.10, 1.21)
<b>Ethereum</b>	1.02 (0.98, 1.07)	1.03 (0.99, 1.08) <sup>+</sup>	1.03 (0.99, 1.07)
<b>Tether</b>	-0.09 (-0.13, -0.06)	-0.08 (-0.11, -0.05) <sup>+</sup>	-0.08 (-0.11, -0.06)



