

Influential Article Review - Understanding the Cryptocurrency Markets

Benjamin Cook

Janis O'brien

Thomas Myers

This paper examines financial innovation. We present insights from a highly influential paper. Here are the highlights from this paper: We study the time varying co-movement patterns of the crypto-currency prices with the help of wavelet-based methods; employing daily bilateral exchange rate of four major crypto-currencies namely Bitcoin, Ethereum, Lite and Dashcoin. First, we identify Bitcoin as potential market leader using Wavelet multiple correlation and Cross correlation. Further, Wavelet Local Multiple Correlation for the given crypto-currency prices are estimated across different time-scales. From the results, it is found that that the correlation follows an aperiodic cyclical nature, and the crypto-currency prices are driven by Bitcoin price movements. Based on the results obtained, we suggest that constructing a portfolio based on crypto-currencies may be risky at this point of time as the other crypto-currency prices are mainly driven by Bitcoin prices, and any shocks in the latter is immediately transformed to the former. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.

Keywords: Bitcoin, Co-movement, Crypto-currencies, Wavelets

SUMMARY

- Before we start the wavelet analysis, we want to see if there exist any long run cointegration among the variables of interest.
- Here, we see that the market is moderately correlated during the period of analysis. And at each scale, the crypto-currency that maximizes the correlation value is against the linear combination of the other crypto-assets are shown in the plot. At all the 4 scales, bitcoin is the one that found to be maximizing WMC, indicating Bitcoin as a potential leader/follower. Next, we try to confirm this fact by estimating Wavelet Multiple Cross Correlation at a lead/lag of 36 days. The results are shown in Fig. 2.
- Observing the WLMC values across different timescales, we can see a number of common factors. First, the correlation among the markets are high across all the timescales. Second, the nature of the correlation varies in a cyclical fashion, albeit an aperiodic one. Further, the markets record the overall highest correlation values in the initial periods . It takes almost 2 years for the market to reach the same peak, and the in-between periods are marred by frequent turbulences. As we proceed from smaller scales to larger scales , the cyclical nature of the WLMC is found to be smoothening, implying that the fluctuations prevailing in the crypto-currency co-movement predominantly are of short term nature.
- In the following paragraphs, we offer possible explanations behind the cyclical nature of the co-movement. As we identified Bitcoin as the potential market leader with the help of wavelet

correlation and cross-correlation analysis, we try to explain the WLMC based on certain events related to Bitcoin prices.

- The WLMC values shows a decreasing trend between August to September 2015. During this period, two major events took place in the Bitcoin market. First, arrest of now defunct crypto-exchange Mt. Gox. CEO and then, the announcement of Bitcoin Fork.
- From the results, it is seen that apart from a fluctuation around the year 2016, the correlation values are around 1. This presents an interesting picture. From the WMC and WMCC results, Bitcoin is identified as the market leader. With a correlation value of 1 persisting for the larger period, it can be said that the market, especially when we consider smaller currencies, follow the fluctuations in the Bitcoin prices always.

HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

S Kumar, A., & Ajaz, T. (2019). Co-movement in crypto-currency markets: evidences from wavelet analysis. *Financial Innovation*, 5(1), 1–17.

This is the link to the publisher's website:

<https://jfin-swufe.springeropen.com/articles/10.1186/s40854-019-0143-3>

INTRODUCTION

Crypto-currencies are the latest addition to the financial instruments, and the ones garnering increased attention during the recent times (Urquhart 2018). The first asset of this class was Bitcoin, launched in 2009 immediately after the 2008 financial crisis. In the initial days, people seemed skeptic about this new product. However, in the last couple of years, there has been an exponential increase in the demand of Bitcoin, and the market has witnessed a huge growth in terms of both market capitalization and introduction of new crypto-currency assets. The number of crypto-currencies has increased from 500 in 2014 (White 2015) to 1560 currencies as on 8 April 2018. The increased market capitalization as well as introduction of new asset points resulted in market becoming more liquid and investors being active. However, irrespective of this upward momentum, there are serious concerns raised about various dimensions of crypto-currency markets.

The high volatility exhibited by the crypto-currency market is a pressing concern. Compared to traditional financial markets, crypto-currency markets are shallow (Bohme et al. 2015); in such a market, any shocks or fluctuation in the market leader may easily transfer and trigger a market collapse. Further, the crypto-currency market, unlike traditional financial markets, has possible unequal distribution of assets. The first-generation miners and investors had relative ease to mine and purchase crypto-assets (Smith and Kumar 2018). With this, there is possibility of engineering price movements. Gandal et al. (2018) shows evidence towards such a suspicious trading activity in Mt. Gox exchange in 2013.

The other dimension being the use of crypto-currencies. Apart from gambling, online gaming, possible money laundering (Moser et.al. 2013) and cross-border transactions, speculation is one of the important motivations associated with crypto-currencies (Smith and Kumar 2018). Glaser et al. (2014) argues that utility for crypto assets stems from their appeal as an asset class. Similar argument is put forward by Baur et al. (2018) based on their analysis of transaction value and frequency in Blockchain.

With crypto-currencies being integrated with the traditional financial assets (see, Tony et al. 2018; Khaled et al. 2018 and Henriques and Sadorsky 2018), there is bound to be more investor attention and the possibility of market being more liquid. In such a scenario, exploring the potential for diversification in crypto-currency markets is of paramount importance. However, the existing research on this phenomenon is sparse. Our paper addresses this issue.

Remainder of this article is structured as follows: Section 2 provides a brief review of literature, section 3 discusses data and methodology employed. Section 4 shows the estimation results and its explanation while section 5 provides the concluding remarks.

CONCLUSION

We studied the time varying co-movement patterns of the crypto-currency markets with the help of wavelet-based methods. Daily bilateral exchange rate of four major crypto-currencies namely Bitcoin, Ethereum, Lite and Dashcoin from 7 August, 2015 to 24 March,2018 were used for the analysis. First, we identified Bitcoin as potential market leader using Wavelet multiple correlation and cross correlation. Next, we estimated Wavelet Local Multiple Correlation for the given crypto-currency prices. From the results, we could observe that the correlation follows an aperiodic cyclical nature, and the crypto-currency prices are influenced by Bitcoin price movements. The demand for crypto- assets increases when Bitcoin prices are on the rise, resulting in a price rise in other crypto-currencies. Conversely, any price drop in Bitcoin is immediately reflected in other crypto-currency prices.

From an investor perspective, this coupling of other crypto-currencies with Bitcoin creates a dilemma. While crypto-currency assets can possibly act as instruments of hedge in a traditional portfolio, along with other assets such as equities and bonds, we do not suggest constructing a portfolio entirely composed of Crypto-assets. From the evidences obtained from the analysis, constructing a portfolio based on crypto-currencies may be risky at this point of time as the alt-coin prices are mainly driven by Bitcoin prices, and any shocks in the latter is immediately transmitted to the former. Even by looking at the skewed market capitalization in the crypto-currency market; with Bitcoin occupying almost 50% of the total market capitalization, it would not be prudent to construct a portfolio that entirely consists of crypto-currency assets.

APPENDIX

FIGURE 1
TIME SERIES PLOT OF THE CRYPTO-CURRENCIES

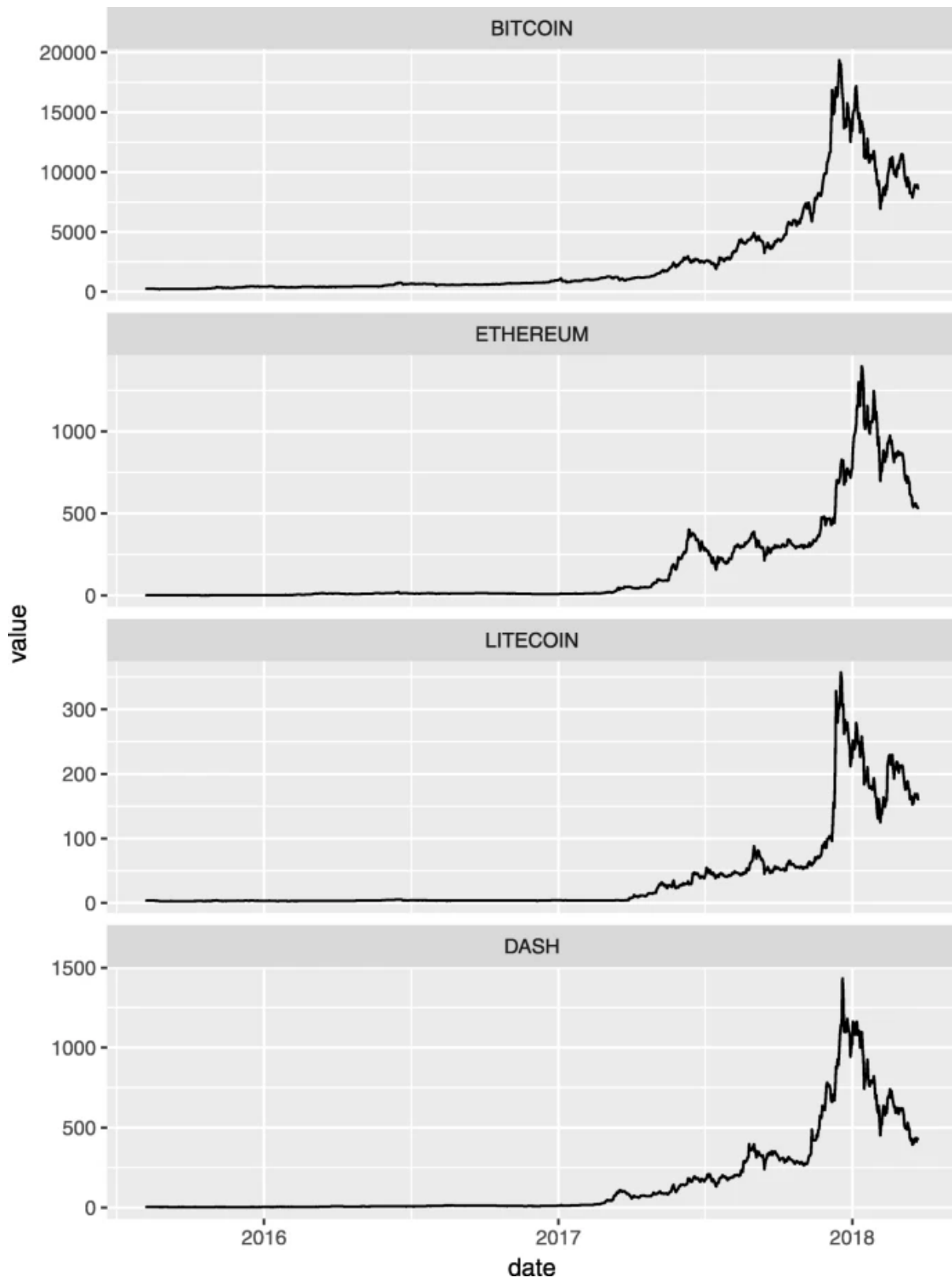


FIGURE 2
WAVELET MULTIPLE CORRELATION OF CRYPTO CURRENCY PRICES

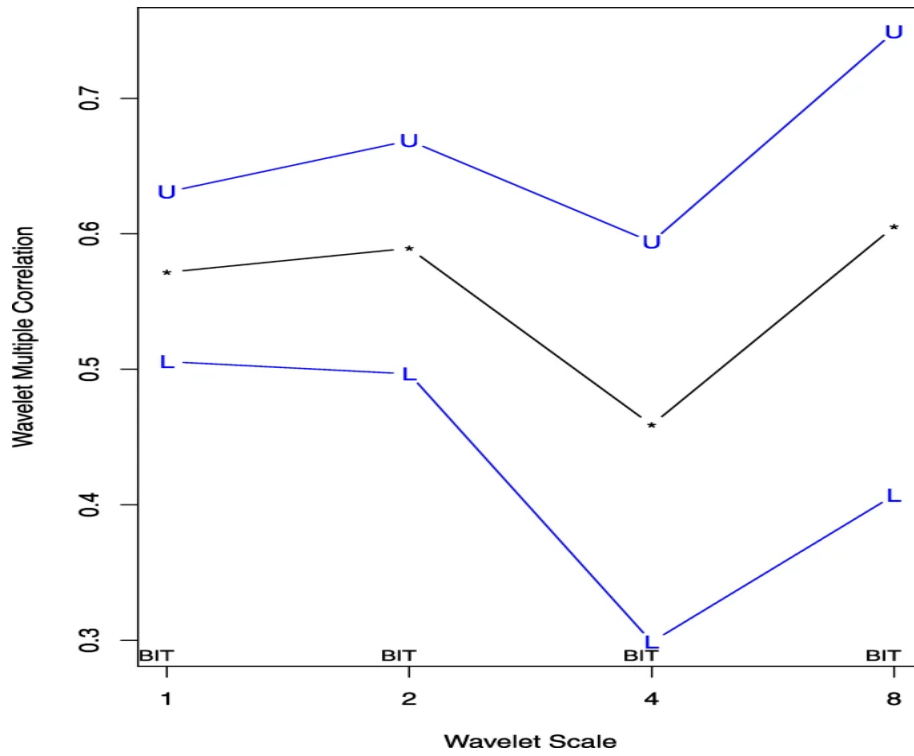


FIGURE 3
WAVELET MULTIPLE CROSS CORRELATION OF CRYPTO CURRENCY PRICES

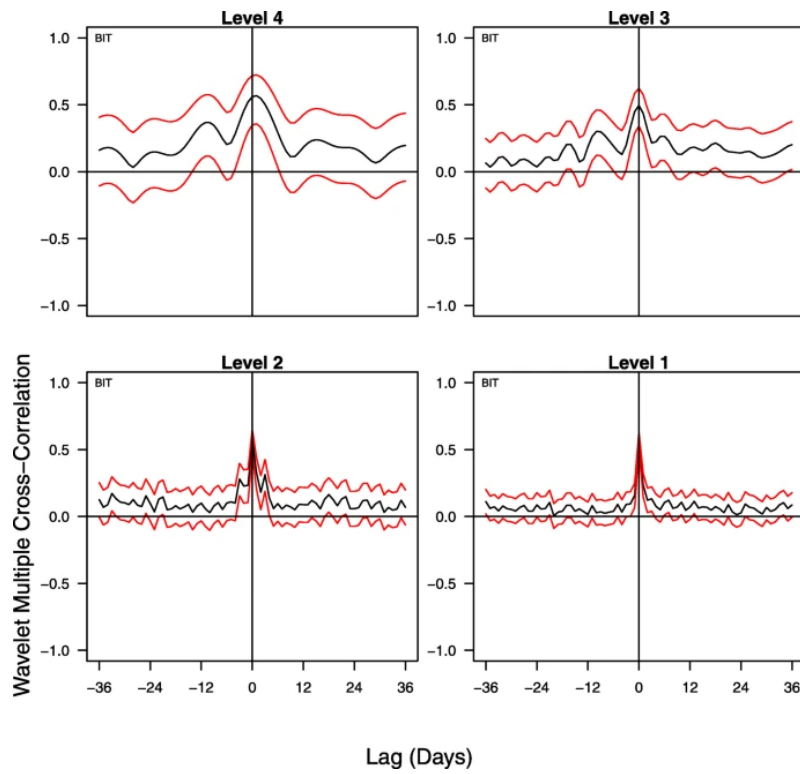


FIGURE 4
WAVELET LOCAL MULTIPLE CORRELATION FOR SCALE 1 (2-4-DAY TIME PERIOD)

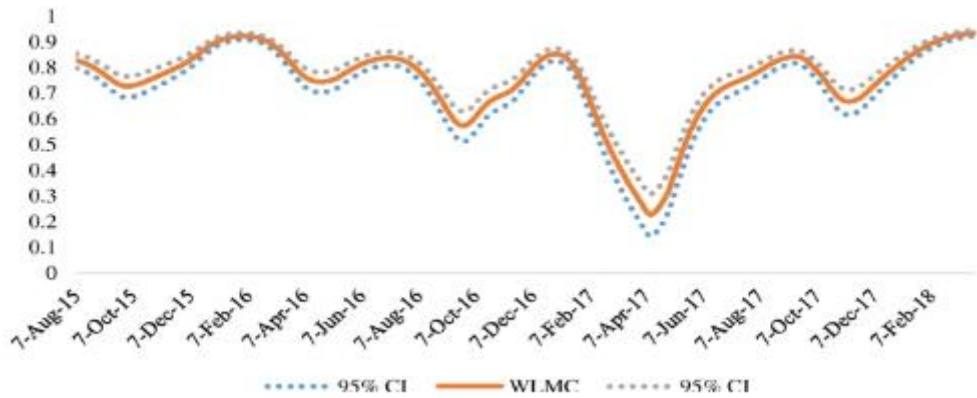


FIGURE 5
WAVELET LOCAL MULTIPLE CORRELATION FOR SCALE 2 (4-8 DAY TIME PERIOD)

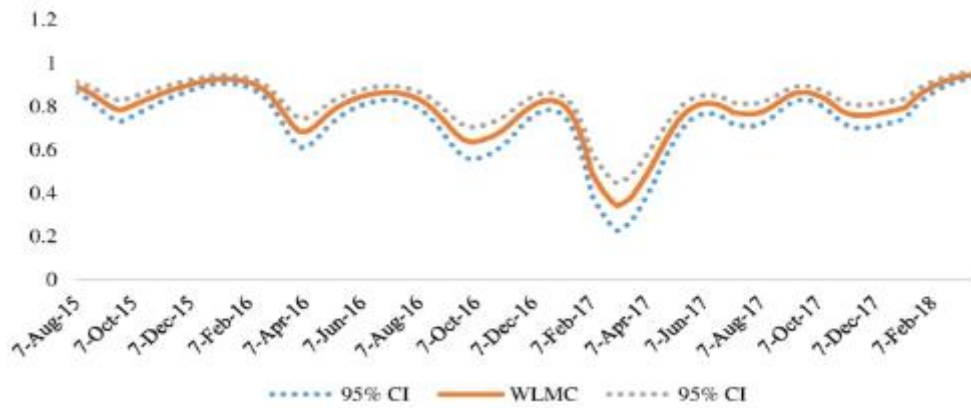


FIGURE 6
WAVELET LOCAL MULTIPLE CORRELATION FOR SCALE 3 (8-16 DAY TIME PERIOD)

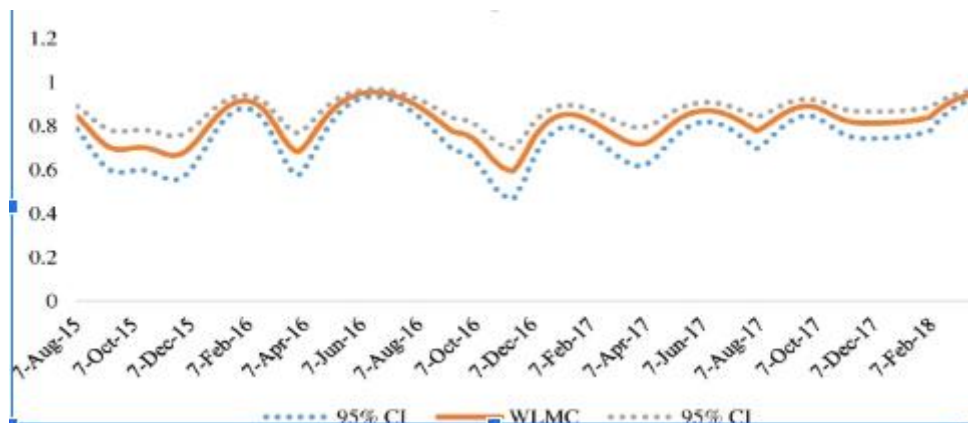
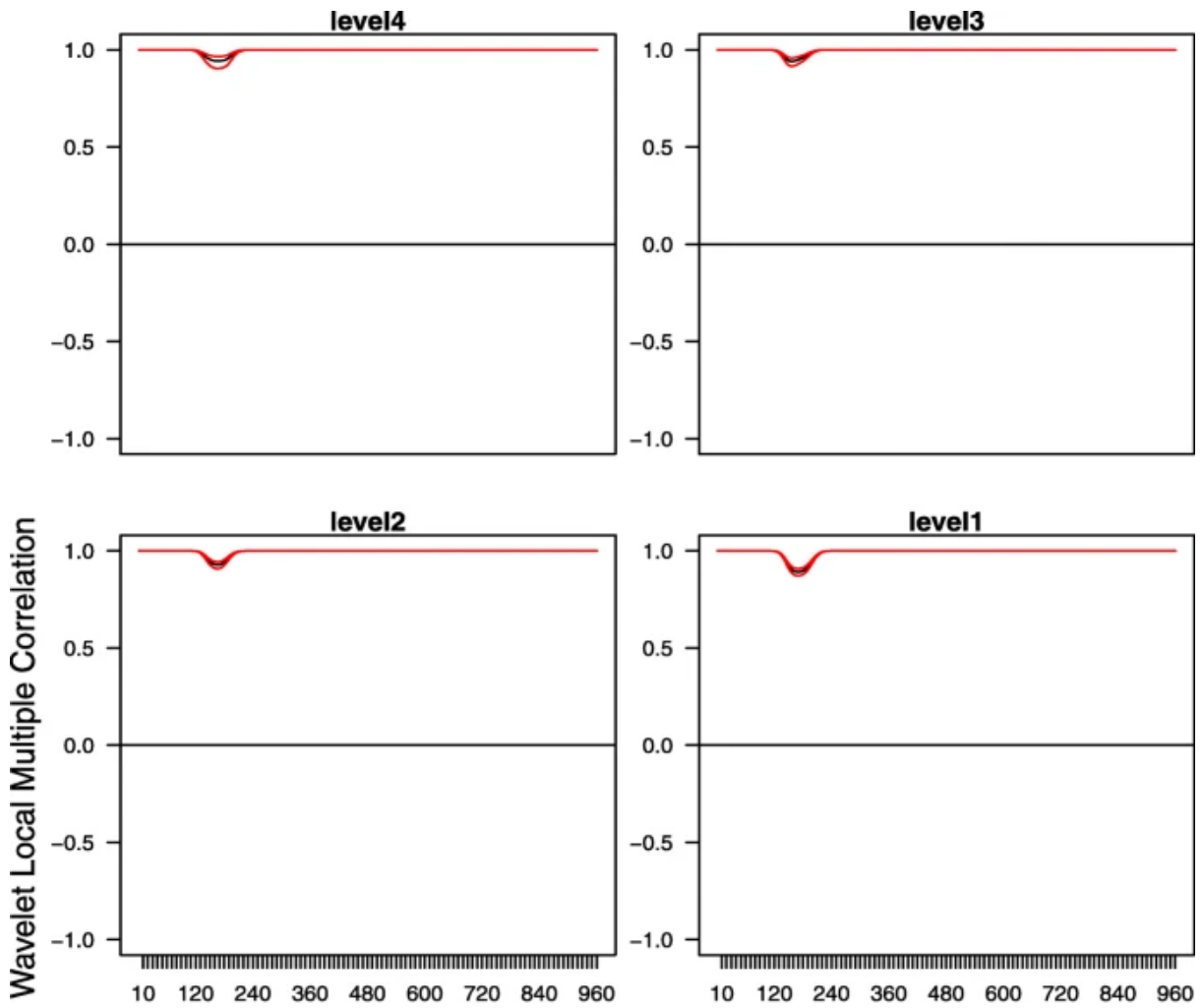


FIGURE 7
WAVELET LOCAL MULTIPLE CORRELATION FOR SCALE 4 (16–32 DAY TIME PERIOD)



FIGURE 8
WAVELET LOCAL MULTIPLE CORRELATION PLOT OF TEN CRYPTO-CURRENCIES



time
TABLE 1

COINTEGRATING RELATIONSHIP BETWEEN THE CRYPTOCURRENCIES

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob. ^a
None ^a	0.034127	33.19537	32.11832	0.0368
At most 1	0.014041	13.51833	25.82321	0.7628
At most 2	0.006314	6.055783	19.38704	0.9534
At most 3	0.005106	4.893530	12.51798	0.6117

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
 denotes rejection of the hypothesis at the 0.05 level

TABLE 2
MAJOR EVENTS IN THE BITCOIN MARKETS

Time Period	Event	Reaction of Bitcoin Prices (after 10 days)	Nature
August 1, 2015	Mark Karpeles, CEO of now defunct Crypto-Exchange Mt. Gox., arrested in Japan in allegations of Financial Fraud.	\$283.04 to \$267.09	Negative
August 15, 2015	New Fork (software upgrade) named Bitcoin XT released	\$267.34 to \$214.3	Negative
September 28, 2015	Crypto currencies termed as a commodity by US regulating agency CFTC	\$234.65 to \$238.15	Positive
October 8, 2015	New Crypto-exchange Gemini launched, with FIDC insurance	\$248.45 to \$268.01	Positive
October 22, 2015	EU Declares no VAT on Bitcoin	\$273.82 to \$318.43	Positive
October 31, 2015	Bitcoin article displayed on the front page of the "Economist"	\$323.35 to \$366.67	Positive
January 14, 2016	Developer Mike Hearn quits Bitcoin	\$431.76 to \$397.92	Negative
April 4, 2016	New Decentralized market software OpenBazaar Launched	\$420.61 to \$426.68	Positive
July 9, 2016	Bitcoin block rewards halved	\$652.14 to \$ 674.03	Positive
August 2, 2016	Bitfinex hacked, \$72 million lost	\$594.86 to \$591.36	Negative
November 9, 2016	Donald Trump elected as US President	\$726.36 to \$749.1	Positive
March 10, 2017	Winkelwos' crypto-currency ETF application rejected by the SEC of USA	\$1201.86 to \$1037.85	Negative
April 1, 2017	Japan declares Bitcoin as a legal tender	\$1085.03 to \$1215.69	Positive
August 1, 2017	Bitcoin splits into Bitcoin Cash and Bitcoin	\$2787.85 to \$3383.89	Positive
September 3, 2017	China bans ICO for crypto-currencies	\$4668.5 to \$4223.82	Negative
September 12, 2017	JP Morgan head calls Bitcoin a fraud	\$4166.59 to \$3807.07	Negative
October 25, 2017	New fork in Bitcoin, Bitcoin Gold launched	\$5682.85 to \$7261.41	Positive
October 31, 2017	CMIE announces Bitcoin futures	\$6121.79 to \$7255.21	Positive
November 8, 2017	Proposed fork cancelled	\$7143.47 to \$7844.44	Positive
December 11, 2017	CBOE Bitcoin Futures are Launched	\$14,594.78\$ to \$ 17,010.5	Positive

REFERENCES

- Ali R, Barrdear J, Clews R, Southgate J (2014) The economics of digital currencies. *Bank England Q Bull* 54(3):276–286
- Baek C, Elbeck M (2015) Bitcoins as an investment or speculative vehicle? A first look. *Appl Econ Lett* 22(1):30–34
- Baur DG, Hong K, Lee AD (2018) Bitcoin: medium of exchange or speculative assets? *J Int Financ Mark Inst Money* 54:177–189
- Blau BM (2017) Price dynamics and speculative trading in bitcoin. *Res Int Bus Financ* 41:493–499
- Bohme R, Chirstin N, Edelman B (2015) Bitcoin: economics, technology, and governance. *J Econ Perspect* 29(2):213–238
- Bouoiyour J, Selmi R (2016) Bitcoin: a beginning of a new phase. *Econ Bull* 36(3):1430–1440
- Bouoiyour J, Selmi R, Tiwari AK, Olayeni OR (2016) What drives bitcoin price. *Econ Bull* 36(2):843–850
- Bouoiyour, J., & Selmi, R. (2017). Are trump and bitcoin good partners?. arXiv preprint arXiv:1703.00308
- Catania L, Stefano G, Francesco R (2019) Forecasting cryptocurrencies under model and parameter instability. *Int J Forecast* 35(2):485–501
- Cheah ET, Fry J (2015) Speculative bubbles in bitcoin markets? An empirical investigation into the fundamental value of bitcoin. *Econ Lett* 130:32–36
- Cheung A, Roca E, Su JJ (2015) Crypto-currency bubbles: an application of the Phillips–Shi–Yu (2013) methodology on Mt. Gox bitcoin prices. *Appl Econ* 47(23):2348–2358
- Chu J, Nadarajah S, Chan S (2015) Statistical analysis of the exchange rate of bitcoin. *PLoS One* 10(7):e0133678. <https://doi.org/10.1371/journal.pone.0133678>
- Ciaian P, Rajcaniova M (2018) Virtual relationships: short-and long-run evidence from bitcoin and altcoin markets. *J Int Financ Mark Inst Money* 52:173–195
- Ciaian P, Rajcaniova M, Kancs DA (2016) The economics of bitcoin price formation. *Appl Econ* 48(19):1799–1815
- Delfin-Vidal R, Romero-Meléndez G (2016) The fractal nature of bitcoin: evidence from wavelet power spectra. In: *Trends in mathematical economics*. Springer, Cham, pp 73–98
- Dirican C, Canoz I (2017) The cointegration relationship between bitcoin prices and major world stock indices: an analysis with ARDL model approach. *J Econ Financ Acc* 4(4):377–392
- Dwyer GP (2015) The economics of bitcoin and similar private digital currencies. *J Financ Stab* 17:81–91
- Dyhrberg AH (2016) Bitcoin, gold and the dollar—a GARCH volatility analysis. *Financ Res Lett* 16:85–92
- Fernández-Macho, J. (2018). Time-localized wavelet multiple regression and correlation. *Physica A: Statistical Mechanics and its Applications*, 492:1226–1238.
- Fisher RA (1922) On the mathematical foundations of theoretical statistics. *Philos Trans R Soc Lond A* 222:309–368
- Fry J, Cheah ET (2016) Negative bubbles and shocks in cryptocurrency markets. *Int Rev Financ Anal* 47:343–352
- Gandal N, Hamrick JT, Moore T, Oberman T (2018) Price manipulation in the bitcoin ecosystem. *J Monet Econ* 95:86–96
- Glaser F, Zimmermann K, Haferkorn M, Weber MC, Siering M (2014) Bitcoin – asset or currency? Revealing users’ hidden intentions. In: *Proceedings of the European Conference on Information Systems (ECIS)*. Association for Information Systems, Tel Aviv
- Godsiff P (2015) Bitcoin: bubble or Blockchain. In: Jezic G, Howlett R, Jain L (eds) *Agent and multi-agent systems: technologies and applications*. Smart innovation, systems and technologies, vol 38. Springer, Cham
- Henriques I, Sadorsky P (2018) Can bitcoin replace gold in an investment portfolio? *J Risk Financ Manage* 11:48
- Hotz-Behofsits C, Florian H, Thomas OZ (2018) Predicting crypto-currencies using sparse non-Gaussian state space models. *J Forecast* 37(6):627–640

- Jiang Y, Nie H, Ruan W (2017) Time-varying long-term memory in bitcoin market. *Financ Res Lett* 25:280–284
- Johansen S (1992) Determination of co-integration rank in the presence of a linear trend. *Oxf Bull Econ Stat* 54:383–397
- Katsiampa P (2017) Volatility estimation for bitcoin: a comparison of GARCH models. *Econ Lett* 158:3–6
- Khaled G, Samir S, Ilyes A, Zied F (2018) Portfolio diversification with virtual currency: evidence from bitcoin. *Int Rev Financ Anal*. <https://doi.org/10.1016/j.irfa.2018.03.004>
- Kristoufek L (2015) What are the main drivers of the bitcoin price? Evidence from wavelet coherence analysis. *PLoS One*. <https://doi.org/10.1371/journal.pone.0123923>
- Macho JF (2012) Wavelet multiple correlation and cross-correlation: a multiscale analysis of eurozone stock markets. *Physica A* 391:1097–1104
- Macho JF (2018) Time-localized wavelet multiple regression and correlation. *Physica A* 492:1226–1238
- Moser M, Bohme R, Breuker D (2013) An inquiry into money laundering tools in the Bitcoin ecosystem. In: *eCrime Researchers Summit (eCRS)*, 2013. IEEE, San Francisco pp 1–14
- Nadarajah S, Chu J (2017) On the inefficiency of bitcoin. *Econ Lett* 150:6–9
- Narayanan A, Bonneau J, Felten E, Miller A, Goldfeder S (2016) *Bitcoin and cryptocurrency technologies: a comprehensive introduction*. Princeton University Press, Princeton
- Pieters G, Vivanco S (2017) Financial regulations and price inconsistencies across bitcoin markets. *Inf Econ Policy* 39:1–14
- Salman A, Razzaq MGA (2018) Bitcoin and the world of digital currencies. In: *Financial Management from an Emerging Market Perspective*. InTech. <https://doi.org/10.5772/intechopen.71294>
- Smith C, Kumar A (2018) Crypto-currencies – an introduction to not-so-funny moneys. *J Econ Surv*. <https://doi.org/10.1111/joes.12289>
- Tony K, Hien PT, Thomas W (2018) Bitcoin is not the new gold – a comparison of volatility, correlation, and portfolio performance. *Int Rev Financ Anal* 59:105–116
- Urquhart A (2016) The inefficiency of bitcoin. *Econ Lett* 148:80–82
- Urquhart A (2017) Price clustering in bitcoin. *Econ Lett* 159:145–148
- Urquhart A (2018) What causes the attention of bitcoin? *Econ Lett* 166:40–44
- Van Alstyne M (2014) Why bitcoin has value. *Commun ACM* 57(5):30–32
- White LH (2015) The market for cryptocurrencies. *Cato J* 35(2):383–402
- Yermack D (2013) Is bitcoin a real currency? An economic appraisal. In: *NBER Working Paper No 19747*
- Zhu Y, Dickinson D, Li J (2017) Analysis on the influence factors of Bitcoin's price based on VEC model. *Financ Innov* 3:3. <https://doi.org/10.1186/s40854-017-0054-0>

TRANSLATED VERSION: SPANISH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUCIDA: ESPAÑOL

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

INTRODUCCIÓN

Las criptomonedas son la última incorporación a los instrumentos financieros, y las que atraen mayor atención durante los últimos tiempos (Urquhart 2018). El primer activo de esta clase fue Bitcoin, lanzado en 2009 inmediatamente después de la crisis financiera de 2008. En los primeros días, la gente

parecía escéptica sobre este nuevo producto. Sin embargo, en los últimos dos años, ha habido un aumento exponencial en la demanda de Bitcoin, y el mercado ha sido testigo de un enorme crecimiento en términos de capitalización de mercado e introducción de nuevos activos cripto-moneda. El número de criptomonedas ha aumentado de 500 en 2014 (Blanco 2015) a 1560 monedas al 8 de abril de 2018. El aumento de la capitalización de mercado, así como la introducción de nuevos puntos de activos, dieron lugar a que el mercado se vuelva más líquido y los inversores se activaran. Sin embargo, independientemente de este impulso ascendente, se plantean serias preocupaciones acerca de las diversas dimensiones de los mercados de criptomonedas.

La alta volatilidad exhibida por el mercado de cripto-moneda es una preocupación apremiante. En comparación con los mercados financieros tradicionales, los mercados de criptomonedas son poco profundos (Bohme et al. 2015); en un mercado de este tipo, cualquier choque o fluctuación en el líder del mercado puede transferir fácilmente y desencadenar un colapso del mercado. Además, el mercado de criptodivisas, a diferencia de los mercados financieros tradicionales, tiene una posible distribución desigual de los activos. Los mineros e inversores de primera generación tuvieron relativa facilidad para extraer y comprar cripto-activos (Smith y Kumar 2018). Con esto, existe la posibilidad de movimientos de precios de ingeniería. (2018) muestra evidencias hacia una actividad comercial sospechosa en el intercambio del Monte Gox en 2013.

La otra dimensión es el uso de criptomonedas. Aparte de los juegos de azar, los juegos en línea, el posible lavado de dinero (Moser et.al. 2013) y las transacciones transfronterizas, la especulación es una de las motivaciones importantes asociadas con las criptomonedas (Smith y Kumar 2018). (2014) argumenta que la utilidad de los activos criptográficos proviene de su apelación como clase de activos. (2018) argumentan argumentos similares basados en su análisis del valor de transacción y la frecuencia en Blockchain.

Con las criptomonedas que se integran con los activos financieros tradicionales (véase, Tony et al. 2018; 2018 y Henriques y Sadorsky 2018), seguramente habrá más atención a los inversores y la posibilidad de que el mercado sea más líquido. En tal escenario, es de suma importancia explorar el potencial de diversificación en los mercados de criptomonedas. Sin embargo, la investigación existente sobre este fenómeno es escasa. Nuestro documento aborda este problema.

El resto de este artículo se estructura de la siguiente manera: La Sección 2 proporciona una breve revisión de la literatura, sección 3 discute los datos y la metodología empleada. La sección 4 muestra los resultados de la estimación y su explicación, mientras que la sección 5 proporciona las observaciones finales.

CONCLUSIÓN

Estudiamos los patrones de movimiento de co-movimiento variables de tiempo de los mercados de criptodivisas con la ayuda de métodos basados en ondas. El tipo de cambio bilateral diario de cuatro criptomonedas principales, a saber, Bitcoin, Ethereum, Lite y Dashcoin del 7 de agosto de 2015 al 24 de marzo de 2018, se utilizaron para el análisis. En primer lugar, identificamos Bitcoin como líder potencial del mercado usando Wavelet correlación múltiple y correlación cruzada. A continuación, estimamos Wavelet Local Multiple Correlation para los precios de criptodivisas dados. De los resultados, podríamos observar que la correlación sigue una naturaleza cíclica aperiódica, y los precios de las criptomonedas están influenciados por los movimientos de precios de Bitcoin. La demanda de activos criptográficos aumenta cuando los precios de Bitcoin están en aumento, lo que resulta en un aumento de precios en otras criptomonedas. Por el contrario, cualquier caída de precios en Bitcoin se refleja inmediatamente en otros precios de la criptomoneda.

Desde la perspectiva de los inversores, este acoplamiento de otras criptomonedas con Bitcoin crea un dilema. Si bien los activos criptodivisas pueden actuar como instrumentos de cobertura en una cartera tradicional, junto con otros activos como acciones y bonos, no sugerimos construir una cartera enteramente compuesta de cripto-activos. A partir de las evidencias obtenidas del análisis, la construcción de una cartera basada en criptomonedas puede ser riesgosa en este momento, ya que los precios de las monedas alternativas son impulsados principalmente por los precios de Bitcoin, y cualquier choque en el segundo se transmite inmediatamente a los primeros. Incluso mirando la capitalización de mercado sesgada en el mercado de criptodivisas; con Bitcoin ocupando casi el 50%

de la capitalización total del mercado, no sería prudente construir una cartera que consiste enteramente en activos crypto-monedas.

TRANSLATED VERSION: FRENCH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUITE: FRANÇAIS

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

INTRODUCTION

Les crypto-monnaies sont le dernier ajout aux instruments financiers, et ceux qui ont attiré l'attention ces derniers temps (Urquhart 2018). Le premier actif de cette catégorie a été Bitcoin, lancé en 2009 immédiatement après la crise financière de 2008. Dans les premiers jours, les gens semblaient sceptiques au sujet de ce nouveau produit. Cependant, au cours des deux dernières années, il y a eu une augmentation exponentielle de la demande de Bitcoin, et le marché a connu une croissance énorme en termes de capitalisation boursière et d'introduction de nouveaux actifs crypto-monnaies. Le nombre de crypto-monnaies est passé de 500 en 2014 (Blanc 2015) à 1560 au 8 avril 2018. L'augmentation de la capitalisation boursière ainsi que l'introduction de nouveaux points d'actif ont permis au marché de devenir plus liquide et aux investisseurs d'être actifs. Toutefois, indépendamment de cette dynamique à la hausse, de sérieuses préoccupations ont été soulevées au sujet des diverses dimensions des marchés des cryptomonnaies.

La forte volatilité du marché des cryptomonnaies est une préoccupation pressante. Par rapport aux marchés financiers traditionnels, les marchés des cryptomonnaies sont peu profonds (Bohme et al., 2015); sur un tel marché, tout choc ou fluctuation du leader du marché peut facilement transférer et déclencher un effondrement du marché. En outre, le marché des cryptomonnaies, contrairement aux marchés financiers traditionnels, a une répartition inégale possible des actifs. Les mineurs et les investisseurs de première génération ont eu une relative facilité à exploiter et à acheter des crypto-actifs (Smith et Kumar 2018). Avec cela, il est possible d'ingénierie des mouvements de prix. Gandal et coll. (2018) montrent des preuves d'une activité commerciale aussi suspecte à la Bourse du Mont Gox en 2013.

L'autre dimension étant l'utilisation des crypto-monnaies. Outre les jeux d'argent, les jeux en ligne, le blanchiment d'argent possible (Moser et al. 2013) et les transactions transfrontalières, la spéculation est l'une des motivations importantes associées aux crypto-monnaies (Smith et Kumar 2018). Glaser et coll. (2014) font valoir que l'utilité des cryptomonnaies découle de leur attrait en tant que catégorie d'actifs. Baur et coll. (2018) avancent des arguments similaires sur la base de leur analyse de la valeur et de la fréquence des transactions en Blockchain.

Avec l'intégration des cryptomonnaies aux actifs financiers traditionnels (voir Tony et coll. 2018; Khaled et coll. 2018 et Henriques et Sadorsky 2018), il y aura forcément plus d'attention des investisseurs et la possibilité que le marché soit plus liquide. Dans un tel scénario, il est d'une importance primordiale d'explorer le potentiel de diversification des marchés des cryptomonnaies. Cependant, les recherches existantes sur ce phénomène sont rares. Notre document traite de cette question.

Le reste de cet article est structuré comme suit : la section 2 fournit un bref examen de la littérature, la section 3 traite des données et de la méthodologie employées. L'article 4 montre les résultats de l'estimation et son explication, tandis que l'article 5 fournit les remarques finales.

CONCLUSION

Nous avons étudié le temps variable des modèles de co-mouvement des marchés des crypto-monnaies à l'aide de méthodes basées sur les ondes. Le taux de change bilatéral quotidien de quatre grandes cryptomonnaies, à savoir Bitcoin, Ethereum, Lite et Dashcoin, du 7 août 2015 au 24 mars 2018, a été utilisé pour l'analyse. Tout d'abord, nous avons identifié Bitcoin comme leader potentiel du marché en utilisant wavelet corrélation multiple et corrélation croisée. Ensuite, nous avons estimé wavelet local corrélation multiple pour les prix donnés crypto-monnaie. D'après les résultats, nous avons pu observer que la corrélation suit une nature cyclique aperiodique, et les prix des crypto-monnaies sont influencés par les mouvements des prix bitcoin. La demande de crypto-actifs augmente lorsque les prix du Bitcoin sont à la hausse, ce qui entraîne une hausse des prix dans d'autres crypto-monnaies. Inversement, toute baisse des prix du Bitcoin se reflète immédiatement dans d'autres prix des cryptomonnaies.

Du point de vue des investisseurs, ce couplage d'autres cryptomonnaies avec Bitcoin crée un dilemme. Bien que les crypto-monnaies puissent servir d'instruments de couverture dans un portefeuille traditionnel, ainsi que d'autres actifs tels que les actions et les obligations, nous ne suggérons pas de construire un portefeuille entièrement composé de crypto-actifs. D'après les éléments de preuve obtenus à partir de l'analyse, la construction d'un portefeuille basé sur des crypto-monnaies peut être risquée à ce stade car les prix des pièces alt sont principalement entraînés par les prix du Bitcoin, et tout choc dans le second est immédiatement transmis à la première. Même en examinant la capitalisation boursière faussée sur le marché des cryptomonnaies; Bitcoin occupant près de 50% de la capitalisation boursière totale, il ne serait pas prudent de construire un portefeuille entièrement constitué d'actifs crypto-monnaies.

TRANSLATED VERSION: GERMAN

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

EINLEITUNG

Kryptowährungen sind die neueste Ergänzung zu den Finanzinstrumenten, und die, die in den letzten Jahren erhöhte Aufmerksamkeit erregten (Urquhart 2018). Der erste Aktivposten dieser Klasse war Bitcoin, das 2009 unmittelbar nach der Finanzkrise 2008 ins Leben gerufen wurde. In den ersten Tagen schien man skeptisch gegenüber diesem neuen Produkt. Jedoch, in den letzten paar Jahren gab es einen exponentiellen Anstieg der Nachfrage nach Bitcoin, und der Markt hat ein enormes Wachstum sowohl in Bezug auf die Marktkapitalisierung und die Einführung neuer Krypto-Währungs-Assets erlebt. Die Zahl der Kryptowährungen ist von 500 im Jahr 2014 (White 2015) auf 1560 Währungen am 8. April 2018 gestiegen. Die erhöhte Marktkapitalisierung sowie die Einführung neuer Asset Points führten dazu, dass der Markt liquider wurde und die Anleger aktiv wurden. Ungeachtet dieser Aufwärtsdynamik gibt es jedoch ernste Bedenken hinsichtlich verschiedener Dimensionen der Kryptowährungsmärkte.

Die hohe Volatilität des Kryptowährungsmarktes ist ein dringendes Anliegen. Im Vergleich zu den traditionellen Finanzmärkten sind die Kryptowährungsmärkte flach (Bohme et al. 2015); in einem solchen Markt können Schocks oder Schwankungen des Marktführers leicht übertragen und einen Marktzusammenbruch auslösen. Darüber hinaus hat der Kryptowährungsmarkt im Gegensatz zu traditionellen Finanzmärkten eine ungleiche Verteilung von Vermögenswerten. Die Bergleute und

Investoren der ersten Generation hatten relativ viel Leichtigkeit, Krypto-Assets zu bergen und zu kaufen (Smith und Kumar 2018). Damit besteht die Möglichkeit von technischen Preisbewegungen. Gandal et al. (2018) zeigt Beweise für eine solche verdächtige Handelsaktivität in Mt. Gox Börse im Jahr 2013.

Die andere Dimension ist die Verwendung von Kryptowährungen. Neben Glücksspielen, Online-Gaming, möglicher Geldwäsche (Moser et al. 2013) und grenzüberschreitenden Transaktionen ist Spekulation eine der wichtigen Motivationen im Zusammenhang mit Kryptowährungen (Smith und Kumar 2018). Glaser et al. (2014) argumentiert, dass der Nutzen für Krypto-Assets aus ihrer Attraktivität als Anlageklasse resultiert. Ähnliches Argument wird von Baur et al. (2018) auf der Grundlage ihrer Analyse des Transaktionswerts und der Häufigkeit in Blockchain vorgebracht.

Mit Kryptowährungen, die in die traditionellen Finanzanlagen integriert werden (siehe Tony et al. 2018; Khaled et al. 2018 und Henriques und Sadorsky 2018), wird es bestimmt mehr Aufmerksamkeit für investoren und die Möglichkeit, dass der Markt liquider ist. In einem solchen Szenario ist es von größter Bedeutung, das Potenzial für eine Diversifizierung auf den Kryptowährungsmärkten zu untersuchen. Die bisherige Forschung zu diesem Phänomen ist jedoch spärlich. Unser Papier befasst sich mit diesem Thema.

Der Rest dieses Artikels ist wie folgt aufgebaut: Abschnitt 2 bietet einen kurzen Überblick über die Literatur, Abschnitt 3 behandelt die verwendeten Daten und Methoden. Abschnitt 4 zeigt die Schätzergebnisse und ihre Erläuterung, während Abschnitt 5 die abschließenden Bemerkungen enthält.

SCHLUSSFOLGERUNG

Wir untersuchten die zeitverändernden Ko-Bewegungsmuster der Kryptowährungsmärkte mit Hilfe von Wavelet-basierten Methoden. Der tägliche bilaterale Wechselkurs von vier wichtigen Kryptowährungen, nämlich Bitcoin, Ethereum, Lite und Dashcoin vom 7. August 2015 bis zum 24. März 2018, wurde für die Analyse verwendet. Erstens haben wir Bitcoin als potenziellen Marktführer identifiziert, indem wir Wavelet-Mehrfachkorrelation und Kreuzkorrelation verwenden. Als nächstes schätzten wir Wavelet Local Multiple Correlation für die angegebenen Kryptowährungspreise. Aus den Ergebnissen konnten wir feststellen, dass die Korrelation einem aperiodischen zyklischen Charakter folgt und die Kryptowährungspreise durch Bitcoin-Kursbewegungen beeinflusst werden. Die Nachfrage nach Krypto-Assets steigt, wenn die Bitcoin-Preise steigen, was zu einem Preisanstieg in anderen Kryptowährungen führt. Umgekehrt spiegelt sich jeder Preisverfall in Bitcoin sofort in anderen Kryptowährungspreisen wider.

Aus Anlegersicht schafft diese Kopplung anderer Kryptowährungen mit Bitcoin ein Dilemma. Obwohl Kryptowährungsanlagen in einem traditionellen Portfolio zusammen mit anderen Vermögenswerten wie Aktien und Anleihen als Sicherungsinstrumente fungieren können, schlagen wir nicht vor, ein Portfolio zu konstruieren, das vollständig aus Crypto-Assets besteht. Aus den Erkenntnissen aus der Analyse, die Erstellung eines Portfolios auf der Grundlage von Kryptowährungen kann zu diesem Zeitpunkt riskant sein, da die Alt-Coin-Preise hauptsächlich durch Bitcoin-Preise getrieben werden, und alle Schocks in der letzteren sofort auf erstere übertragen werden. Selbst wenn man sich die verzerrte Marktkapitalisierung auf dem Kryptowährungsmarkt anschaut; Da Bitcoin fast 50 % der gesamten Marktkapitalisierung einnimmt, wäre es nicht klug, ein Portfolio zu konstruieren, das vollständig aus Kryptowährungsanlagen besteht.

TRANSLATED VERSION: PORTUGUESE

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsabilize os autores originais responsáveis por estes erros.

INTRODUÇÃO

As criptomoedas são a mais recente adição aos instrumentos financeiros, e as que ganharam maior atenção nos últimos tempos (Urquhart 2018). O primeiro ativo desta classe foi o Bitcoin, lançado em 2009 imediatamente após a crise financeira de 2008. Nos dias iniciais, as pessoas pareciam céticas sobre este novo produto. No entanto, nos últimos dois anos, tem havido um aumento exponencial da procura de Bitcoin, e o mercado tem assistido a um enorme crescimento tanto em termos de capitalização de mercado como de introdução de novos ativos em criptomoedas. O número de criptomoedas aumentou de 500 em 2014 (Branco 2015) para 1560 moedas em 8 de abril de 2018. O aumento da capitalização de mercado, bem como a introdução de novos pontos de ativos, levaram a que o mercado se tornasse mais líquido e a ativação dos investidores. No entanto, independentemente desta dinâmica ascendente, existem sérias preocupações levantadas sobre várias dimensões dos mercados de criptomoedas.

A elevada volatilidade exibida pelo mercado da criptomoeda é uma preocupação premente. Em comparação com os mercados financeiros tradicionais, os mercados de criptomoedas são pouco profundos (Bohme et al. 2015); neste mercado, quaisquer choques ou flutuações no líder de mercado podem facilmente transferir e desencadear um colapso do mercado. Além disso, o mercado da criptomoeda, ao contrário dos mercados financeiros tradicionais, tem uma possível distribuição desigual dos ativos. Os mineiros e investidores de primeira geração tinham relativa facilidade em minar e comprar cripto-ativos (Smith e Kumar 2018). Com isto, existe a possibilidade de movimentos de preços de engenharia. Gandal et al. (2018) mostra evidências de uma atividade comercial tão suspeita na bolsa de Mt. Gox em 2013.

A outra dimensão é o uso de criptomoedas. Além do jogo, jogos online, possível branqueamento de capitais (Moser et al. 2013) e transações transfronteiriças, a especulação é uma das motivações importantes associadas às criptomoedas (Smith e Kumar 2018). Glaser et al. (2014) argumenta que a utilidade para os ativos cripto decorre do seu apelo como classe de ativos. Argumento semelhante é apresentado pela Baur et al. (2018) com base na sua análise do valor e frequência de transações em Blockchain.

Com as criptomoedas a serem integradas com os ativos financeiros tradicionais (ver, Tony et al. 2018; Khaled et al. 2018 e Henriques e Sadorsky 2018), é provável que haja mais atenção dos investidores e a possibilidade de o mercado ser mais líquido. Neste cenário, explorar o potencial de diversificação nos mercados de criptomoedas é da maior importância. No entanto, a investigação existente sobre este fenómeno é escassa. O nosso jornal aborda esta questão.

O restante deste artigo é estruturado da seguinte forma: A Secção 2 fornece uma breve revisão da literatura, a secção 3 discute dados e metodologias utilizadas. A secção 4 mostra os resultados da estimativa e a sua explicação, enquanto a secção 5 fornece as observações finais.

CONCLUSÃO

Estudámos o tempo que variava os padrões de co-movimento dos mercados de criptomoedas com a ajuda de métodos baseados em ondas. A taxa de câmbio bilateral diária de quatro grandes criptomoedas, nomeadamente Bitcoin, Ethereum, Lite e Dashcoin de 7 de agosto de 2015 a 24 de março de 2018 foram utilizadas para a análise. Primeiro, identificámos o Bitcoin como potencial líder de mercado usando a correlação múltipla de Wavelet e a correlação cruzada. Em seguida, estimámos a Wavelet Local Multiple Correlation para os preços da criptomoeda. Pelos resultados, podemos observar que a correlação segue uma natureza cíclica aperiódica, e os preços da criptomoeda são influenciados pelos movimentos dos preços de Bitcoin. A procura por cripto-ativos aumenta quando os preços de Bitcoin estão em alta, resultando num aumento de preços em outras criptomoedas. Inversamente, qualquer queda de preço em Bitcoin reflete-se imediatamente em outros preços de criptomoeda.

Do ponto de vista dos investidores, este acoplamento de outras criptomoedas com o Bitcoin cria um dilema. Embora os ativos em criptomoedas possam funcionar como instrumentos de cobertura numa carteira tradicional, juntamente com outros ativos, como ações e obrigações, não sugerimos a

construção de uma carteira inteiramente composta por cripto-ativos. A partir das provas obtidas a partir da análise, a construção de uma carteira baseada em criptomoedas pode ser arriscada neste momento, uma vez que os preços das moedas alt são principalmente impulsionados pelos preços de Bitcoin, e quaisquer choques neste último são imediatamente transmitidos à primeira. Mesmo olhando para a capitalização de mercado distorcida no mercado da criptomoeda; com a Bitcoin a ocupar quase 50% da capitalização total do mercado, não seria prudente construir uma carteira que consiste inteiramente em ativos em criptomoedas.