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STABLECOIN DP2P: INNOVATION AND SUSTAINABILITY IN FIAT CURRENCIES

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Abstract
This study investigates the potential of decentralised stablecoins (dP2P) as financing mechanisms and currency stabilisers in developing economies. The quantitative, exploratory, and correlational approach, based on the hypothetical-deductive method, uses data from 2010 to 2020 provided by sources such as The World Bank, OECD, and IMF, covering both developing and developed countries. The main hypothesis is that dP2P offers greater exchange rate stability compared to fiat currencies in emerging economies. The methodology involves applying simple moving averages (SMA) to assess exchange rate volatility and compare the performance of dP2P with traditional currencies. The results reveal that during the analysed decade, several fiat currencies experienced significant depreciations, while dP2P exhibited lower volatility. Argentina and Angola recorded the largest depreciations, reflecting high levels of economic instability, whereas currencies like the Costa Rican colon and the Vietnamese dong showed greater resilience. dP2P tracked the depreciation trends of fiat currencies, but with less intensity, indicating a higher potential for value preservation. The main contributions of this study are the empirical validation of stablecoins as a viable alternative to mitigate exchange rate volatility in emerging economies and the introduction of SMA as an effective tool for analysing the stability of crypto assets, expanding the application of statistical methods in evaluating decentralised finance (DeFi).
Keywords: Stablecoins, FIAT, volatility, and Fiat currencies,
JEL classification: G10, G23, E44, E47,

1. Introduction

Financial systems possess an intrinsic capacity for adaptation, constantly seeking to optimise their operational processes to effectively respond to the dynamics and complexities of global markets (Gomber et al., 2018; Thakor, 2020). This adaptability is reflected in the implementation of innovative technologies, the redefinition of business models, and the reformulation of regulatory structures (Cong et al., 2019; Frost et al., 2019). However, trust among the various participants in the financial ecosystem remains a fundamental and

unalterable requirement (Beck et al., 2018; Allen et al., 2022). In the realm of crypto-assets, the need for trust assumes even greater relevance due to high levels of volatility, significant market inefficiency, and pronounced value fluctuations (Baek & Elbeck, 2015; Corbet et al., 2019). These specificities distinguish crypto-assets from traditional financial assets, highlighting their importance in the contemporary financial landscape and necessitating distinct approaches at both operational and regulatory levels (Cappai, 2023; Cerqueira et al., 2024). This study examines the potential of an alternative stablecoin, termed dP2P, as a credit financing mechanism and currency stabiliser in developing economies. The approach used is quantitative, exploratory, and correlational, based on the hypothetical-deductive method. The study conducts a diachronic and longitudinal analysis, drawing on data from multiple countries between 2010 and 2020, sourced from entities such as The World Bank, OECD, and IMF. The methodology focuses on comparing the exchange rate volatility between dP2P and fiat currencies pegged to the euro. To this end, SMA are applied to smooth short-term fluctuations and identify long-term trends. The use of this statistical technique is justified by its effectiveness in signalling trend changes and identifying support and resistance levels, as demonstrated by previous studies. The results show that dP2P presents lower exchange rate volatility compared to most of the fiat currencies analysed, particularly in countries with a history of high inflation and economic instability. Extreme cases of currency depreciation, such as those of Argentina and Angola, validate the hypothesis that dP2P can serve as a means of value preservation in volatile markets. The analysis of moving averages demonstrates that dP2P follows the general trend of fiat currency depreciation but maintains superior relative stability. Annual comparisons reveal that dP2P managed to outperform the depreciation of some fiat currencies during periods of high volatility, highlighting its potential as an alternative for mitigating currency risks. The empirical validation of stablecoins as currency stabilisation tools in emerging economies demonstrates their significant potential to enhance financial sustainability. Concurrently, the introduction of SMA emerges as an innovative technique for analysing the stability of crypto-assets, providing a more systematic and reliable approach. Furthermore, the research explores and expands the application of statistical methods in the context of DeFi, highlighting the relevance of crypto-assets for economic development. This advancement offers valuable insights for investors, policymakers, and academics interested in understanding the impact of these technologies on the global financial landscape. The use of smart contracts emerges as an essential element in economic relations mediated by crypto-assets, representing a promising opportunity for future investigations, particularly concerning the decentralised intermediation between economic agents.

2.   Literature Review

The transition from centralised financial systems (CeFi) to DeFi represents a paradigm shift in how money is conceived and interacted with (Zetzsche et al., 2020; Schär, 2021). This evolution can be traced back to the end of the Bretton Woods Agreement (1968-1973), a historical milestone that detached currency from the gold standard and consolidated the fiat system (Rolfe, 2019; Sussman & Wyplosz, 2024). Huang et al. (2019) and Chen and Bellavitis (2020) analysed this change, showing that the value of fiat currency results from collective perception, without tangible collateral, being influenced by supply and demand. The adoption of this monetary regime spurred financial digitalisation, facilitating the emergence of innovations such as stablecoins, designed to reduce volatility and provide greater market predictability (Bullmann et al., 2019; Auer et al., 2022). DeFi systems, based on blockchain technology, offer significant advantages in terms of transaction speed and costs, as demonstrated by Nadini et al. (2021) and Ozili (2022). Unlike centralised systems, which can take up to 48 hours to process operations on the SEPA network, blockchain technology enables almost instant executions, according to Ozili (2023) and Kukman & Gričar (2025). Additionally, the elimination of intermediaries reduces errors and minimises banking fraud, a persistent issue in the traditional financial system, as noted by Bodó & De Filippi (2022) and Auer et al. (2024). The inherent transparency of DeFi also helps mitigate corruption, a particularly relevant challenge in emerging markets, according to Li & Xu (2021) and Weingärtner et al. (2023). However, the adoption of DeFi is not without

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challenges. Zarrin et al. (2021) and Mueller-Bloch (2024) identify the need for high computational power to process decentralised transactions, while Ante et al. (2021) and Lloyd (2022) highlight the difficulty in defining interest rates and returns. Additionally, Drechsler et al. (2019) and Chiu et al. (2023) point out the environmental impact of blockchains, such as Ethereum, posing a hurdle to overcome. The immutability of smart contracts, despite being a fundamental characteristic of the blockchain, can hinder adaptation to future changes (Vacca et al., 2021; John et al., 2023). The issue of stablecoins is central to DeFi, as they seek to solve the volatility of conventional cryptocurrencies (Jarno & Kołodziejczyk, 2021; Schumacher, 2024). Liu et al. (2022) and Dragomir & Dumitru (2023) differentiate the creation of crypto-assets through minting, as in Bitcoin, from the issuance of stablecoins, which are backed by fiat currency, usually the US dollar (Catalini et al., 2022; Lyons & Viswanath-Natraj, 2023). These coins ensure stability through reserves equivalent to the underlying asset (Kochergin, 2022; Benedetti & Smith, 2024). The sustainability of stablecoins depends on two critical factors: the volatility of the reserves and the risk of a "death spiral," a collapse in value if the stablecoin loses its peg (Bouri et al., 2019; Griffin & Shams, 2020). To mitigate this risk, it is necessary to maintain liquid, high-quality reserves and implement strategies to protect against credit and market risks (Gorton & Zhang, 2021; Hoang & Baur, 2024). If the peg between the stablecoin and the fiat currency is compromised, a negative spiral can occur, triggering a crisis of confidence in the DeFi ecosystem (Moine et al., 2020; Lee et al., 2025). In the peer-to-peer (P2P) context, DeFi facilitates direct transactions between economic agents, eliminating intermediaries and allowing for greater financial inclusion (Zervas et al., 2018; Makarov & Schoar, 2020). Einav et al. (2016) and Xiong et al. (2022) note that the P2P market adjusts prices based on supply and demand. Community finance, a branch of P2P, promotes the decentralised redistribution of resources, encouraging solidarity and mutual support (Boreiko & Vidusso, 2019; Drasch et al., 2020). Schneider (2019) and Mattke et al. (2021) demonstrate that investors choose financial assets not only based on expected returns but also on social and ethical factors, highlighting the growing relevance of social responsibility in the financial sector. P2P lending facilitates the financing of small and medium-sized enterprises, diversifying the risks of the financial system (Pierrakis, 2019; Fuster et al., 2019). However, there are inherent risks, such as credit risk associated with contract defaults, market risk arising from interest rate and currency fluctuations, and liquidity risk related to the financial institution's ability to meet commitments (Franks et al., 2021; Fuster et al., 2022). Ferrari (2020) and Fang et al. (2022) highlight that economic uncertainty in developing countries exacerbates these risks, increasing market volatility. Additionally, institutional investors tend to be more risk-tolerant, while retail investors demonstrate greater aversion, which can create asymmetries in the P2P credit market (Caldieraro et al., 2018; Cumming et al., 2021). In summary, the transition from CeFi to DeFi represents a structural change in the financial system, bringing advantages such as agility, reduced costs, and transparency, but also challenges related to governance, regulation, and the sustainability of stablecoins (Belke & Beretta, 2020; Schuler et al., 2024).

3. Methodology

The research adopted a quantitative, exploratory, and correlational approach, based on the hypothetical-deductive method, to formulate assumptions and identify correlations. A diachronic and longitudinal study was conducted to analyse the evolution of phenomena over time, using common data from multiple countries to detect trends and relationships between variables. This study analyses the potential of an alternative crypto-asset, a dP2P, to finance credit in developing economies and reduce inflation, with support from international investors. The central objective is to verify whether dP2P offers greater exchange rate stability compared to the fiat currencies that comprise it. The main hypothesis is that dP2P can replace fiat currencies as an exchange rate stabiliser, minimising fluctuations. The research focuses on the sustainability of the crypto-asset as a financing tool, comparing its variations with those of traditional currencies over a given period. The sample includes developing and developed countries, with data from 2010 to 2020, extracted from The World Bank, OECD, and IMF. The selection of this period is based on data availability, the emergence of cryptocurrencies in 2008, and the limitation of Covid-19 impacts. Exchange

rates of native currencies pegged to the euro were analysed, considering their attractiveness for lenders and borrowers. The sample includes Angola, Argentina, Chile, the Democratic Republic of Congo, Colombia, Costa Rica, India, Nigeria, Vietnam, and South Africa, selected based on information availability from the IMF. Criteria include data integrity on interest rates, GDP, and credit volume to the private sector. Developing countries were identified by GDP per capita ($4.18 to $24.92 thousand USD) and interest rates (4.18% to 67.25%). Data processing in this study was conducted through the comparison of SMA, a statistical technique applied to assess exchange rate volatility between fiat currencies and a proposed crypto-asset. The choice of this methodology is based on its ability to smooth short-term fluctuations, allowing the identification of long-term trends and the assessment of the relative stability of the assets under analysis. The use of SMA is aligned with existing literature. Marshall et al. (2017) and Karasu et al. (2020) highlight the usefulness of moving averages as robust indicators for price dynamics analysis, trend validation, and identification of support and resistance levels. Hudson & Urquhart (2021) and Mikhaylov et al. (2023) corroborate this perspective, emphasising the application of the SMA as a tool for signalling changes in the price trend of financial assets. The SMA is calculated using the following formula:

$$SMA_t = \frac{1}{n}\sum_{t=0}^{n-1} p_{t-n}$$

Where SMA_t represents the value of the SMA at a given time t, n represents the number of periods, and p_{t-n} represents the price at time t-n.

The application of this formula allows for the calculation of the arithmetic mean of an asset's prices over a specific period, smoothing out daily fluctuations and highlighting the overall trend. As demonstrated by Resta et al. (2020) and Wei et al. (2023), comparing the SMA between fiat currencies and the proposed crypto-asset enables the assessment of their relative stability, identifying which asset exhibits lower exchange rate volatility over the analysed period. The comparative analysis of SMA allows for inference about the crypto-asset's ability to act as a stabiliser of exchange rate fluctuations, compared to fiat currencies. According to Baur & Hoang (2021) and Kyriazis et al. (2021), the lower volatility observed in the crypto-asset, when compared to fiat currencies, indicates greater stability and lower exposure to abrupt fluctuations, validating the hypothesis that the crypto-asset can be an effective mechanism for mitigating exchange rate volatility in developing economies. Pronchakov & Bugaienko (2019) and Dolatsara et al. (2022), the adopted methodology, centred on the comparison of SMA, offers a clear and concise approach to analysing exchange rate volatility. Its application, supported by existing literature, provides robustness and validity to the obtained results, contributing to the understanding of the crypto-asset's role as a financing and exchange rate stabilisation mechanism in developing economies.

4. Results

Table 1 presents the exchange rate variation of different fiat currencies (FIAT) relative to the stablecoin dP2P over the years, highlighting the appreciation or depreciation of these currencies compared to dP2P. Over the analysed decade, most FIAT currencies exhibited a significant depreciation trajectory. The accumulated value for dP2P is -103.383%, demonstrating that, on average, the stablecoin dP2P showed better resilience to value loss than many of the analysed fiat currencies. Argentina (ARS) and Angola (AOA) exhibit the highest accumulated depreciations, with -366.072% and -231.736%, respectively. Argentina is particularly affected, as in 90% of the years, its currency performed worse than dP2P, indicating a high level of instability. Nigeria (NGN) and South Africa (ZAR) also had significant negative performances, with accumulated depreciations of -97.412% and -81.779%. On the other hand, some currencies performed relatively better, such as the Costa Rican colon (CRC) and the Vietnamese dong (VND), which show lower accumulated depreciations (-13.284% and -10.213%) and performed worse than dP2P in only 10% of the years. Comparing with the stablecoin dP2P, it is noted that in 60% of the years, the Angolan kwanza (AOA) performed worse than dP2P, while the Colombian peso (COP) and the South

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African rand (ZAR) performed worse in 20% and 40% of the years, respectively. The Argentine peso (ARS) consistently had one of the worst performances, being surpassed by dP2P in 90% of the analysed years. The significant depreciation of some currencies reflects macroeconomic challenges such as high inflation, political instability, and inconsistent monetary policies. The Argentine case is particularly severe, as the peso has suffered from recurring crises, reflected in its high depreciation. dP2P, as a stablecoin composed of a set of currencies, showed lower volatility compared to several FIAT currencies, suggesting that it can serve as a means of value preservation in markets subject to high exchange rate fluctuations. The analysis reinforces the importance of currency diversification and the use of stable assets like dP2P in economies with high rates of monetary depreciation. The sharp depreciation of some currencies can negatively impact purchasing power and investor confidence, increasing the adoption of digital and decentralised alternatives. The performance of dP2P over the years demonstrates that it can be a viable alternative to mitigate risks associated with exchange rate volatility, especially in countries with a high history of inflation and economic instability. The analysis of Table 1 shows that the stablecoin dP2P performed more stable than most of the analysed fiat currencies. In particular, countries like Argentina and Angola suffered the greatest exchange rate depreciations, reinforcing the need for alternatives to protect the value of financial assets.

Table 1 – dP2P Composition by Currencies and Exchange Rate Variation

Country	FIAT	Appreciation / Depreciation of FIAT Currencies in Developing Countries with EUR Parity (Year-on-Year)					
		2010	2011	2012	2013	2014	2015
Angola	Kwanza (AOA)	0,0%	1,2%	-4,3%	-6,3%	6,8%	-17,7%
Argentina	Argentine Peso (ARS)	0,0%	-5,5%	-16,5%	-38,5%	-13,4%	-39,1%
Chile	Chilean Peso (CLP)	0,0%	-8,8%	10,6%	-15,5%	-4,1%	-0,7%
Dem. Rep. of Congo	Congolese Franc (CDF)	0,0%	0,1%	-1,4%	-4,6%	11,7%	9,0%
Colombia	Colombian Peso (COP)	0,0%	-3,8%	9,7%	-11,2%	-2,6%	-22,0%
Costa Rica	Costa Rican Colon (CRC)	0,0%	-0,0%	1,9%	-3,5%	1,6%	15,8%
India	Indian Rupee (INR)	0,0%	-14,4%	-6,1%	-17,6%	9,1%	6,5%
Nigeria	Nigerian Naira (NGN)	0,0%	-7,8%	4,4%	-5,4%	-2,4%	4,7%
Vietnam	Vietnamese Dong (VND)	0,0%	-8,7%	2,9%	-6,0%	7,2%	10,8%
South Africa	South African Rand (ZAR)	0,0%	-20,7%	-5,3%	-29,8%	3,6%	-20,3%
Appreciation	*dP2P* *Stablecoin*	*0,0%*	*-6,9%*	*-0,4%*	*-13,8%*	*1,7%*	*-5,3%*

Legend: appreciation dP2P > appreciation FIAT; apreciation dP2P < apreciation FIAT

Source: Own elaboration

Table 2 – dP2P Composition by Currencies and Exchange Rate Variation (cont.)

Country	FIAT	Appreciation / Depreciation of FIAT Currencies in Developing Countries with EUR Parity (Year-on-Year)				
		2016	2017	2018	2019	2020
Angola	Kwanza (AOA)	-18,0%	-14,0%	-78,4%	-51,6%	-49,4%
Argentina	Argentine Peso (ARS)	-18,1%	-37,4%	-87,7%	-55,7%	-54,2%
Chile	Chilean Peso (CLP)	4,8%	-6,4%	-0,1%	-19,5%	-0,9%
Dem. Rep. of Congo	Congolese Franc (CDF)	-22,4%	-52,9%	0,7%	-1,2%	-28,9%
Colombia	Colombian Peso (COP)	-2,6%	-5,8%	-3,4%	-4,9%	-11,7%
Costa Rica	Costa Rican Colon (CRC)	-4,6%	-14,7%	-1,5%	8,9%	-17,2%
India	Indian Rupee (INR)	1,9%	-7,7%	-4,1%	0,1%	-12,6%
Nigeria	Nigerian Naira (NGN)	-54,3%	-11,6%	-14,1%	3,3%	-14,2%
Vietnam	Vietnamese Dong (VND)	-1,6%	-11,5%	1,4%	3,8%	-8,6%
South Africa	South African Rand (ZAR)	14,4%	-2,4%	-11,1%	4,3%	-14,4%
appreciation	*dP2P* *Stablecoin*	*-10,0%*	*-16,4%*	*-19,8%*	*-11,2%*	*-21,2%*

Legend: appreciation dP2P > appreciation FIAT; apreciation dP2P < apreciation FIAT

Source: Own ellaboration

Table 3 – dP2P Composition by Currencies and Exchange Rate Variation (cont.)

Country	FIAT	Accumulated	% of Years with FIAT Performance Inferior to dP2P
Angola	Kwanza (AOA)	*-231,7%*	*60%*
Argentina	Argentine Peso (ARS)	*-366,1%*	*90%*
Chile	Chilean Peso (CLP)	*-40,4%*	*40%*
Dem. Rep. of Congo	Congolese Franc (CDF)	*-89,8%*	*40%*
Colombia	Colombian Peso (COP)	*-58,2%*	*20%*
Costa Rica	Costa Rican Colon (CRC)	*-13,3%*	*10%*
India	Indian Rupee (INR)	*-44,9%*	*30%*
Nigeria	Nigerian Naira (NGN)	*-97,4%*	*30%*
Vietnam	Vietnamese Dong (VND)	*-10,2%*	*10%*
South Africa	South African Rand (ZAR)	*-81,8%*	*40%*

appreciation	*dP2P*	***Stablecoin***	***-103,4%***

Legend: appreciation dP2P > appreciation FIAT; apreciation dP2P < apreciation FIAT
Source: Own ellaboration

Table 2 presents the analysis of SMA in the exchange rate variation of the Fiat index of developing countries and the stablecoin dP2P, highlighting the influence of depreciation movements on dP2P. The analysis reveals that the stablecoin dP2P significantly follows the depreciation trends of fiat currencies over the analysed period (2012-2020), with a progressive depreciation trajectory, reaching an accumulated -17.420% in 2020. The countries with the highest average depreciations over the years were Argentina and Angola. Argentina stands out for the strong and continuous depreciation of the Argentine peso, with significant negative values such as -20.175% in 2013, -31.514% in 2017, and a progressive worsening until reaching -65.860% in 2020. This trend reinforces the country's exchange rate instability, associated with high inflation and recurring economic crises. Similarly, Angola recorded continuous and sharp depreciation of the kwanza, with -5.721% in 2015, -16.573% in 2017, and an even greater decline in 2020, reaching -59.784%. These values indicate a significant weakening of the Angolan currency, reflecting structural economic challenges and high dependence on natural resources. Other countries, such as Nigeria and South Africa, also demonstrated considerable negative trends. Nigeria recorded severe depreciation in 2016 (-17.346%) and 2017 (-20.419%), remaining in negative levels until 2020 (-8.313%). South Africa had similar behaviour, with significant declines in 2013 (-18.603%) and 2015 (-15.490%), but some recovery in subsequent years. On the other hand, some countries demonstrated greater exchange rate resilience. Chile, for example, showed smoother fluctuations, alternating between periods of appreciation and depreciation, such as in 2016 (0.008%) and 2018 (-0.531%), remaining relatively stable. Vietnam and Costa Rica also recorded some positive variations, with the Vietnamese dong showing a growth of 5.455% in 2016 and the Costa Rican colon having a positive peak of 4.638% in 2015. These countries demonstrated greater economic stability, possibly due to more effective monetary policies and less dependence on volatile external factors. Comparing the results with the variation of dP2P, it is observed that it follows the general depreciation trend, although less intensely in some periods. In 2015, dP2P recorded a drop of -5.789%, lower than the depreciations observed in some currencies, such as the Argentine peso (-30.337%) and the Angolan kwanza (-5.721%). However, in deeper crisis years, such as 2018 and 2019, dP2P presented more pronounced declines (-15.437% and -15.835%, respectively), reflecting the global pressure on exchange assets. The analysis of the data in Table 2 confirms that the stablecoin dP2P is influenced by the negative fluctuations of FIAT currencies but maintains a relatively more stable performance compared to some highly volatile currencies. The significant depreciation of several currencies reflects underlying economic challenges in the analysed countries, reinforcing the importance of stable exchange rate alternatives, such as dP2P, for mitigating financial risks and preserving value in economies susceptible to monetary crises.

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Table 4 – SMA of Fiat Exchange Rate Variation in Developing Countries and dP2P

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020
Angola	-1,1%	-3,2%	-1,3%	-5,7%	-9,6%	-16,6%	-36,8%	-48,0%	-59,8%
Argentina	-7,4%	-20,2%	-22,8%	-30,3%	-23,5%	-31,5%	-47,7%	-60,3%	-65,9%
Chile	0,6%	-4,6%	-3,0%	-6,8%	0,0%	-0,7%	-0,5%	-8,6%	-6,8%
Dem. Rep. of Congo	-0,4%	-2,0%	1,9%	5,4%	-0,6%	-22,1%	-24,9%	-17,8%	-9,8%
Colombia	2,0%	-1,8%	-1,4%	-11,9%	-9,1%	-10,1%	-3,9%	-4,7%	-6,7%
Costa Rica	0,6%	-0,5%	0,0%	4,6%	4,3%	-1,2%	-6,9%	-2,4%	-3,3%
India	-6,9%	-12,7%	-4,9%	-0,7%	5,9%	0,2%	-3,3%	-3,9%	-5,5%
Nigeria	-1,2%	-2,9%	-1,1%	-1,0%	-17,4%	-20,4%	-26,7%	-7,5%	-8,3%
Vietnam	-1,9%	-3,9%	1,37%	4,0%	5,5%	-0,8%	-3,9%	-2,1%	-1,1%
South Africa	-8,7%	-18,6%	-10,5%	-15,5%	-0,8%	-2,8%	0,3%	-3,1%	-7,1%
dP2P variation	-2,4%	-7,0%	-4,2%	-5,8%	-4,5%	-10,6%	-15,4%	-15,8%	-17,4%

Source: Own ellaboration

Table 3 presents a comparative summary of the SMA between the Fiat currencies of developing countries and the stablecoin dP2P over nine years (2012-2020), identifying the periods during which fiat currencies experienced greater depreciations than dP2P. The analysis highlights the high volatility of some currencies, especially those of Angola (AOA), Argentina (ARS), and South Africa (ZAR), which showed a significant number of years where their depreciation exceeded that of the stablecoin. Argentina stands out as the most extreme case, with 100% of the analysed years (9 out of 9) showing a depreciation greater than dP2P. This result confirms the exchange rate fragility of the Argentine peso, reflecting the persistence of economic crises, high inflation, and monetary instability in the country. This consistent pattern of depreciation reinforces the idea that currencies like the ARS may not be viable options for investors or financiers seeking predictability and stability. Angola also shows a considerable rate of depreciation greater than dP2P, occurring in 5 out of the 9 analysed years (55.56%). This behaviour reflects the country's economic difficulties, including dependence on oil exports and macroeconomic instability, which frequently impact the exchange rate of the kwanza. South Africa, although performing slightly better, records 4 years (44.44%) of depreciation greater than the stablecoin, indicating significant exchange rate fluctuations, possibly associated with political factors, energy crises, and variations in the export sector. Other countries, such as India and Nigeria, present a moderate rate of depreciation greater than dP2P (33.33%), suggesting less pronounced but still relevant volatility. Countries like Chile (11.11%), the Democratic Republic of Congo (22.22%), and Colombia (22.22%) show greater resilience, with only a few years of more intense depreciation than the stablecoin. Costa Rica and Vietnam stand out for the absence of years in which their currencies depreciated more than dP2P, indicating a more stable and predictable behaviour over the analysed period. This factor may make them safer options for investors seeking lower exposure to exchange rate risk. When analysed year by year, it is observed that the periods from 2015 to 2018 were the most volatile, with four fiat currencies depreciating more than dP2P. On the other hand, the years 2019 and 2020 showed a slight improvement in exchange rate stability, with only two currencies exceeding the stablecoin's depreciation. The results of Table 3 reinforce the idea that exchange rate volatility can pose a significant challenge for investors and financiers, especially in emerging economies with unstable monetary policies. dP2P emerges as a relatively more stable alternative compared to some of these currencies, potentially offering greater predictability and protection against significant depreciations.

Table 5 – Summary of the Comparison of the SMA of Fiat Currencies in Developing Countries and dP2P

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	Number of Years	*Fiat of Developing Countries Inferior to dP2P (country over the period)"* Percentage
Angola	0	0	0	0	1	1	1	1	1	*5*	*55,56%*
Argentina	1	1	1	1	1	1	1	1	1	*9*	*100,00%*
Chile	0	0	0	1	0	0	0	0	0	*1*	*11,11%*
Dem. Rep. of Congo	0	0	0	0	0	1	1	0	0	*2*	*22,22%*

Country	Year									Number of Years	Fiat of Developing Countries Inferior to dP2P (country over the period)" Percentage
	201	201	201	201	201	201	201	201	202		
Colombia	0	0	0	1	1	0	0	0	0	2	22,22%
Costa Rica	0	0	0	0	0	0	0	0	0	0	0,00%
India	1	1	1	0	0	0	0	0	0	3	33,33%
Nigeria	0	0	0	0	1	1	1	0	0	3	33,33%
Vietnam	0	0	0	0	0	0	0	0	0	0	0,00%
South Africa	1	1	1	1	0	0	0	0	0	4	44,44%
Fiat of Developing Countries Inferior to dP2P (each year)	3	3	3	4	4	4	4	2	2		

Legend: 1 = it is inferior: 0 = it is not inferior.
Source: Own ellaboration

5. Discussion

The study analyses the typology of dP2P, classifying it as either mint or stablecoin, each with distinct algorithmic specificities (Catalini & Gans, 2018; Li et al., 2025). Mint, created through smart contracts, exhibits high volatility due to neglect of macroeconomic dynamics of supply and demand (Bouri et al., 2021; Chiu & Keister, 2022). In contrast, stablecoins offer greater stability, being perceived as a "safe haven" against volatility (Baur et al., 2018; Borri, 2019). These cryptocurrencies are pegged to currencies or assets, making them more sustainable in the long term (Bullmann et al., 2019; Amatus, 2024). The value management of dP2P is based on DeFi protocols, combining tokens in diversified pools through smart contracts (Harvey et al., 2021; Tzeng & Su, 2024). This structure functions as a digital portfolio reinforced by innovative risk management strategies (Carapella et al., 2022; Roy et al., 2024). Despite its advantages, the model faces challenges related to exchange rate fluctuations (Corbet et al., 2019; Makarov & Schoar, 2020). Stability requires a careful selection of the currencies that make up its base (Fang et al., 2022; Hoang & Baur, 2024). It is more suitable for sophisticated investors, as prolonged retention may lead to asset depreciation (Jensen et al., 2021; De Cruz, 2024). In developing countries, dP2P emerges as an alternative to unstable fiat currencies, facilitating liquidity access through decentralised exchanges (Gandal et al., 2019; Zetzsche et al., 2020). Investment strategies directed towards regions with lower currency variations can encourage its financing (Deng, 2022; Miori & Cucuringu, 2024). The analysis of exchange rate variations revealed significant depreciations in fiat currencies, notably Argentina (-366.072%) and Angola (-231.736%). The stability of stablecoins depends on their structure and user confidence (Giudici, 2022; Kwon et al., 2023). Conclusively, the diversified model of dP2P demonstrates potential as a viable financial alternative, especially in decentralised global markets. In volatile markets, these stable digital assets can mitigate financial risks and preserve value, constituting a promising alternative for emerging economies.

6. Conclusions

This research evaluated the potential of the stablecoin dP2P as a credit financing instrument and exchange rate stabiliser in developing economies. Through a quantitative, exploratory, and correlational methodology, based on the hypothetical-deductive method, we examined data from 2010 to 2020 from reliable sources such as The World Bank, OECD, and IMF. We systematically compared the exchange rate volatility between dP2P and fiat currencies pegged to the euro using SMA. The results obtained reveal that in a context where financial systems are characterised by constant adaptability to the dynamics of global markets, crypto-assets stand out for the greater importance attributed to trust, given their volatility and pronounced value variation compared to traditional financial assets. The analysis of exchange rate variation during the studied decade evidenced significant depreciation in most FIAT currencies. In this scenario, despite recording an accumulated value of -103.383%, dP2P demonstrated greater resilience against value loss compared to several of the analysed currencies. Notably, Argentina (ARS) and Angola (AOA) recorded accumulated depreciations of -366.072% and -231.736%, respectively, with Argentina underperforming dP2P in 90% of the analysed years. Nigeria (NGN) and South Africa (ZAR)

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also showed significant depreciations (-97.412% and -81.779%), while Costa Rica (CRC) and Vietnam (VND) demonstrated greater stability (-13.284% and -10.213%). The investigation of moving averages in the exchange rate variation of the Fiat index in developing countries and dP2P revealed that, although the stablecoin follows the depreciation trends of fiat currencies, it presents a less pronounced trajectory. This pattern was consistent throughout the analysed period, with the years 2015 to 2018 proving particularly volatile, during which four fiat currencies depreciated more than dP2P. It is important to highlight that dP2P emerged as a relatively more stable alternative compared to various fiat currencies, especially in economies characterised by high rates of monetary depreciation. Thus, this stablecoin may play a crucial role as a means of value preservation in markets subject to significant exchange rate fluctuations. The empirical validation of stablecoins as exchange rate stabilisation instruments in emerging economies demonstrates their significant potential to enhance the financial sustainability of these markets. The SMA methodology applied in this study presents itself as an innovative approach to analysing the stability of crypto-assets, providing a more systematic and reliable perspective on the impact of these technologies on the global financial landscape. In summary, this study contributes to the literature on emerging financial technologies, emphasising the importance of exchange rate diversification and the use of stable digital assets as a strategy to mitigate the effects of economic instability in emerging markets. Future research may expand on these results, exploring the practical implementation of these mechanisms in different economic and regulatory contexts.

7. References

Adisa, O., Ilugbusi, B. S., Obi, O. C., Awonuga, K. F., Adelekan, O. A., Asuzu, O. F., & Ndubuisi, N. L. (2024). Decentralized Finance (DEFI) in the US economy: A review: Assessing the rise, challenges, and implications of blockchain-driven financial systems. World Journal of Advanced Research and Reviews, 21(1), 2313-2328. https://doi.org/10.30574/wjarr.2024.21.1.0321.

Allen, F., Gu, X., & Jagtiani, J. (2021). A survey of fintech research and policy discussion. Review of Corporate

Aquilina, M., Frost, J., & Schrimpf, A. (2024). Decentralized finance (DeFi): a functional approach. Journal of Financial Regulation, 10(1), 1-27. https://doi.org/10.1093/jfr/fjad013.

Auer, R., Frost, J., Gambacorta, L., Monnet, C., Rice, T., & Shin, H. S. (2022). Central bank digital currencies: motives, economic implications, and the research frontier. Annual review of economics, 14(1), 697-721. https://doi.org/10.1146/annurev-economics-051420-020324.

Baum, A. (2021). Tokenization—The future of real estate investment. The Journal of Portfolio Management, 47(10), 41-61. https://doi.org/10.3905/jpm.2021.1.260.

Baur, D. G., Dimpfl, T., & Kuck, K. (2018). Bitcoin, gold and the US dollar–A replication and extension. Finance research letters, 25, 103-110. https://doi.org/10.1016/j.frl.2017.10.012.

Beck, R., Müller-Bloch, C., & King, J. L. (2018). Governance in the Blockchain Economy: A Framework and Research Agenda. Journal of the Association for Information Systems, 19(10), 1020-1034. https://doi.org/10.17705/1jais.00518.

Beha F, Ruxho F.. (2024). "How Does Public Debt Affect Economic Growth? The Case of the New EU Member States", Global Business & Finance Review 29 (5), 45

Belke, A., & Beretta, E. (2020). From cash to central bank digital currencies and cryptocurrencies: a balancing act between modernity and monetary stability. Journal of Economic Studies, 47(4), 911-938. https://doi.org/10.1108/JES-07-2019-0311.

Benedetti, H., & Smith, S. S. (2024). Cryptoassets and Fintech. In The Emerald Handbook of Fintech: Reshaping Finance (pp. 267-281). Emerald Publishing Limited. https://doi.org/10.1108/978-1-83753-608-520241034.

Bodó, B., & De Filippi, P. (2022). Trust in Context: The Impact of Regulation on Blockchain and DeFi. Blockchain & Society Policy Research Lab Research Nodes, 1. https://dx.doi.org/10.1111/rego.12637.

Borri, N. (2019). Conditional tail-risk in cryptocurrency markets. Journal of Empirical Finance, 50, 1-19. https://doi.org/10.1016/j.jempfin.2018.11.002.

Bouri, E., Lau, C. K. M., Lucey, B., & Roubaud, D. (2019). Trading volume and the predictability of return and volatility in the cryptocurrency market. Finance Research Letters, 29, 340-346. https://doi.org/10.1016/j.frl.2018.08.015.

Bullmann, D., Klemm, J., & Pinna, A. (2019). In search for stability in crypto-assets: are stablecoins the solution? (No. 230). ECB Occasional Paper. https://doi.org/10.2866/969389.

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Regional Science Inquiry, Vol. XVII, (1), 2025, pp. 95-106

Caldieraro, F., Zhang, J. Z., Cunha Jr, M., & Shulman, J. D. (2018). Strategic information transmission in peer-to-peer lending markets. Journal of Marketing, 82(2), 42-63. https://doi.org/10.1509/jm.16.0113.

Cappai, M. (2023). The role of private and public regulation in the case study of crypto-assets: The Italian move towards participatory regulation. Computer Law & Security Review, 49, 105831. https://doi.org/10.1016/j.clsr.2023.105831.

Carapella, F., Dumas, E., Gerszten, J., & Swem, N. (2022). Decentralized Finance (DeFi): Transformative Potential and Associated Risks. Policy Hub, 2022(14). https://dx.doi.org/10.17016/FEDS.2022.057.

Casino, F., Dasaklis, T. K., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications: Current status, classification and open issues. Telematics and informatics, 36, 55-81. https://doi.org/10.1016/j.tele.2018.11.006.

Catalini, C., & Gans, J. (2018). Initial Coin Offerings and the Value of Crypto Tokens (No. 24418). National Bureau of Economic Research, Inc. 1 https://doi.org/10.3386/w24418.

Cerqueira, P., Ribeiro, O., Mateus-Coelho, N., & Ferreira, L. (2024). Blockchain-Decentralized Bookmaker. Procedia Computer Science, 237, 138-146. https://doi.org/10.1016/j.procs.2024.05.089.

Copestake, A., Furceri, D., & Gonzalez-Dominguez, P. (2023). Crypto market responses to digital asset policies. Economics Letters, 222, 110949. https://doi.org/10.1016/j.econlet.2022.110949.

Corbet, S., Lucey, B., Urquhart, A., & Yarovaya, L. (2019). Cryptocurrencies as a financial asset: A systematic analysis. International Review of Financial Analysis, 62, 182-199. https://doi.org/10.1016/j.irfa.2018.09.003.

Cumming, D., Hornuf, L., Karami, M., & Schweizer, D. (2021). Disentangling crowdfunding from fraudfunding. Journal of Business Ethics, 1-26. https://doi.org/10.1007/s10551-021-04942-w.

De Cruz, A. F. (2024). Legal and Regulatory Institutional Governance. In Business Ethics: An Institutional Governance Approach to Ethical Decision Making (pp. 133-171). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-97-5408-3_6.

Deng, J. (2022). The crowding-out effect of formal finance on the P2P lending market: An explanation for the failure of China's P2P lending industry. Finance Research Letters, 45, 102167. https://doi.org/10.1016/j.frl.2021.102167.

Drechsler, I., Savov, A., & Schnabl, P. (2021). Banking on deposits: Maturity transformation without interest rate risk. The Journal of Finance, 76(3), 1091-1143. https://doi.org/10.1111/jofi.13013.

Eichengreen, B., & Viswanath-Natraj, G. (2022). Stablecoins and Central Bank Digital Currencies: Policy and Regulatory Challenges. Asian Economic Papers, 21(1), 29-46. https://doi.org/10.1162/asep_a_00843.

Ferrari, V. (2020). The regulation of crypto-assets in the EU–investment and payment tokens under the radar. Maastricht Journal of European and Comparative Law, 27(3), 325-342. https://doi.org/10.1177/1023263X20911538.

Foley, S., Karlsen, J. R., & Putniņš, T. J. (2019). Sex, drugs, and bitcoin: How much illegal activity is financed through cryptocurrencies?. The Review of Financial Studies, 32(5), 1798-1853. https://doi.org/10.1093/rfs/hhz015.

Franks, J., Serrano-Velarde, N., & Sussman, O. (2021). Marketplace lending, information aggregation, and liquidity. The Review of Financial Studies, 34(5), 2318-2361. https://doi.org/10.1093/rfs/hhaa101.

Frost, J., Gambacorta, L., Huang, Y., Shin, H. S., & Zbinden, P. (2019). BigTech and the changing structure of financial intermediation. Economic policy, 34(100), 761-799. https://doi.org/10.1093/epolic/eiaa003.

Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. (2018). Price manipulation in the Bitcoin ecosystem. Journal of Monetary Economics, 95, 86-96. https://doi.org/10.1016/j.jmoneco.2017.12.004,

Gorton, G. B., & Zhang, J. Y. (2023). Taming wildcat stablecoins. University of Chicago Law Review, 90, 1-33. https://dx.doi.org/10.2139/ssrn.3888752.

Goula, M., Ladias, Christos Ap., Gioti-Papadaki, O., & Hasanagas, N. 2015. The spatial dimension of environment-related attitudes: does urban or rural origin matter?. Regional Science Inquiry, 7(2), 115-129.

Griffin, J. M., & Shams, A. (2020). Is Bitcoin really untethered?. The Journal of Finance, 75(4), 1913-1964. https://doi.org/10.1111/jofi.12903.

Harvey, C. R., Ramachandran, A., & Santoro, J. (2021). DeFi and the Future of Finance. John Wiley & Sons. https://dx.doi.org/10.2139/ssrn.3711777.

Hoang, L. T., & Baur, D. G. (2024). How stable are stablecoins?. The European Journal of Finance, 30(16), 1984-2000. https://doi.org/10.1080/1351847X.2021.1949369.

Jensen, J. R., von Wachter, V., & Ross, O. (2021). An introduction to decentralized finance (defi). Complex Systems Informatics and Modeling Quarterly, (26), 46-54. https://doi.org/10.7250/csimq.2021-26.03.

John, K., O'Hara, M., & Saleh, F. (2022). Bitcoin and beyond. Annual Review of Financial Economics, 14(1), 95-115. https://doi.org/10.1146/annurev-financial-111620-011240.

Kahya, A., Krishnamachari, B., & Yun, S. (2021). Reducing the Volatility of Cryptocurrencies: A Survey of Stablecoins. arXiv preprint arXiv:2103.01340. https://doi.org/10.48550/arXiv.2103.01340.

Kochergin, D. (2022). Crypto-assets: Economic nature, classification and regulation of turnover. International organisations research journal, 17(3), 75-130. https://doi.org/10.17323/1996-7845-2022-03-04.

Krupavicius, A., Šarkute, L., Krasniqi, A., Ladias, Christos Ap. 2024. Perceived and desired images of society: how (un)equal is society? Regional Science Inquiry, 16(1), pp. 55-70

Kukman, T., & Gričar, S. (2025). Blockchain for Quality: Advancing Security, Efficiency, and Transparency in Financial Systems. FinTech, 4(1), 7. https://doi.org/10.3390/fintech4010007.

Kyriazis, N., Papadamou, S., & Corbet, S. (2020). A systematic review of the bubble dynamics of cryptocurrency prices. Research in International Business and Finance, 54, 101254. https://doi.org/10.1016/j.ribaf.2020.101254.

Ladias C.A., Ruxho F., Teixeira F., Pescada S., 2023, "The regional economic indicators and economic development of Kosovo", Regional Science Inquiry, Vol. XV, (1), pp. 73-83

Lampreia M., Teixeira F., Pescada S. P. V., 2024. "The predictive power of technical analysis: evidence from the gbp/usd exchange rate", Sustainable Regional Development Scientific Journal, Vol. I, (3), pp. 67-75

Mueller-Bloch, C., Andersen, J. V., Spasovski, J., & Hahn, J. (2024). Understanding decentralization of decision-making power in proof-of-stake blockchains: an agent-based simulation approach. European journal of information systems, 33(3), 267-286. https://doi.org/10.1080/0960085X.2022.2125840.

Nadini, M., Alessandretti, L., Di Giacinto, F., Martino, M., Aiello, L. M., & Baronchelli, A. (2021). Mapping the NFT revolution: market trends, trade networks, and visual features. Scientific reports, 11(1), 20902. https://doi.org/10.1038/s41598-021-00053-8.

Ozili, P. K. (2023). Central bank digital currency research around the World: a review of literature. Journal of Money Laundering Control, 26(2), 215-226. https://doi.org/10.1108/JMLC-11-2021-0126.

Resta, M., Pagnottoni, P., & De Giuli, M. E. (2020). Technical analysis on the bitcoin market: trading opportunities or investors' pitfall?. Risks, 8(2), 44. http://dx.doi.org/10.3390/risks8020044.

Rossi, E. (2024). Stablecoins in Three Dimensions: Foundations of Value in the Crypto-Economy. Advances in Blockchain Research and Cryptocurrency Behaviour, 157. https://doi.org/10.1515/9783110981551-009.

Roy, D., Dubey, A., & Tiwary, D. (2024). Conceptualizing an Institutional Framework to Mitigate Crypto-Assets' Operational Risk. Journal of Risk and Financial Management, 17(12), 550. https://doi.org/10.3390/jrfm17120550.

Ruxho F., Ladias C.A, 2022 "Increasing funding for the regional industry of Kosovo and impact on economic growth" Regional Science Inquiry Journal, Vol. XIV. (1), pp. 117-126

Ruxho F., Ladias C.A, Tafarshiku A., Abazi E., 2023 "Regional employee's perceptions on decent work and economic growth: labour market of Albania and Kosovo", Regional Science Inquiry, Vol. XV, (2), pp.13-23.

Ruxho F., Ladias C.A., 2022 "The logistic drivers as a powerful performance indicator in the development of regional companies of Kosovo" Regional Science Inquiry Journal, Vol. XIV. (2), pp. 95-106

Ruxho F., Petropoulos D., Negoro D.A. 2024. "Public debt as a determinant of the economic growth in Kosovo", Sustainable Regional Development Scientific Journal, Vol. I, (1), pp. 55-67

Schär, F. (2021). Decentralized finance: on blockchain and smart contract-based financial markets. Review of the Federal Reserve Bank of St Louis, 103(2), 153-174. http://dx.doi.org/10.20955/r.103.153-74.

Schloesser, T., & Schulz, K. (2022). Distributed ledger technology and climate finance. In Green digital finance and sustainable development goals (pp. 265-286). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-19-2662-4_13.

Schneider, N. (2019). Decentralization: an incomplete ambition. Journal of cultural economy, 12(4), 265-285. https://doi.org/10.1080/17530350.2019.1589553.

Schuler, K., Cloots, A. S., & Schär, F. (2024). On DeFi and On-Chain CeFi: How (Not) to Regulate Decentralized Finance. Journal of Financial Regulation, 10(2), 213-242. https://doi.org/10.1093/jfr/fjad014.

Schumacher, L. V. (2024). Exploring Stablecoins: Ensuring Stability in a Volatile Crypto Market. In Decoding Digital Assets: Distinguishing the Dream from the Dystopia in Stablecoins, Tokenized Deposits, and Central Bank Digital Currencies (pp. 65-77). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-54601-3_11.

Senner, R., & Sornette, D. (2019). The holy grail of crypto currencies: ready to replace fiat money?. Journal of Economic Issues, 53(4), 966-1000. https://doi.org/10.1080/00213624.2019.1664235.

Sequeira T., Rego C., Dionisio A., 2024. "Investment and productivity in the agro-industrial sector: a case study", Sustainable Regional Development Scientific Journal, Vol. I, (2): Special Issue, pp. 13-26

SSPV PESCADA, F RUXHO, C PALMA, 2024. "Glamping In Low-Density Territories: The Case Of Santo Aleixo Da Reastaura?? O", Regional Science Inquiry 16 (1), 71-80

Stavara M., Tsiotas D., 2024. "A combined graph theoretic and transport planning framework for the economic and functional analysis of large-scale road networks", Sustainable Regional Development Scientific Journal, Vol. I, (2): Special Issue, pp. 27-39

Sussman, N., & Wyplosz, C. (2024). Exchange rate regime choices in small open economies from Bretton Woods to inflation targeting. Comparative Economic Studies, 66(3), 394-414. https://doi.org/10.1057/s41294-024-00237-x.

Teixeira F.,, SSPV Pescada, Ruxho F., 2024. "The efficacy of technical analysis in the foreign exchange market: a case study of the USD/JPY pair", Sustainable Regional Development Scientific Journal 1 (2), 68-75

Thakor, A. V. (2020). Fintech and banking: What do we know?. Journal of financial intermediation, 41, 100833. https://doi.org/10.1016/j.jfi.2019.100833.

Tsiotas, D., Krabokoukis, T., & Polyzos, S. 2020. Detecting interregional patterns in tourism seasonality of Greece: A principal components analysis approach. Regional Science Inquiry, 12(2), 91-112.

Tsiotas, D., Polyzos, S., 2024. "Transportation networks and regional development: the conceptual and empirical framework in Greece", Sustainable Regional Development Scientific Journal, Vol. I, (1), pp. 15-39

Tzeng, K. Y., & Su, Y. K. (2024). Can US macroeconomic indicators forecast cryptocurrency volatility?. The North American Journal of Economics and Finance, 74, 102224. https://doi.org/10.1016/j.najef.2024.102224.

Vacca, A., Di Sorbo, A., Visaggio, C. A., & Canfora, G. (2021). A systematic literature review of blockchain and smart contract development: Techniques, tools, and open challenges. Journal of Systems and Software, 174, 110891. https://doi.org/10.1016/j.jss.2020.110891.

Wei, M., Sermpinis, G., & Stasinakis, C. (2023). Forecasting and trading Bitcoin with machine learning techniques and a hybrid volatility/sentiment leverage. Journal of Forecasting, 42(4), 852-871. https://doi.org/10.1002/for.2922.

Weingärtner, T., Fasser, F., Reis Sá da Costa, P., & Farkas, W. (2023). Deciphering DeFi: A comprehensive analysis and visualization of risks in decentralized finance. Journal of risk and financial management, 16(10), 454. https://doi.org/10.3390/jrfm16100454.

Xiong, L., Wang, C., & Xu, Z. (2022). Supply and demand matching model of P2P sharing accommodation platforms considering fairness. Electronic Commerce Research, 1-28. https://doi.org/10.1007/s10660-020-09437-w.

Yermack, D. (2017). Corporate governance and blockchains. Review of finance, 21(1), 7-31. https://doi.org/10.1093/rof/rfw074.

Zarrin, J., Wen Phang, H., Babu Saheer, L., & Zarrin, B. (2021). Blockchain for decentralization of internet: prospects, trends, and challenges. Cluster Computing, 24(4), 2841-2866. https://doi.org/10.1007/s10586-021-03301-8.

Zervas, G., Proserpio, D., & Byers, J. W. (2017). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. Journal of marketing research, 54(5), 687-705. https://doi.org/10.1509/jmr.15.0204.

Zetzsche, D. A., Arner, D. W., & Buckley, R. P. (2020). Decentralized finance. Journal of Financial Regulation, 6(2), 172-203. https://doi.org/10.1093/jfr/fjaa010.