



COVID-19 Cryptocurrency Investment: Wealth Disparities and Portfolio Diversification

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Abstract

The introduction of cryptocurrency and blockchain technology has provided many investors the option to engage in the market, diversify their portfolios, and accumulate wealth. The high return on cryptocurrency during the pandemic has served as an incentive for all ethnic groups to participate in the market. Cryptocurrency is perceived as a hedging instrument for wealth prospects across races during COVID-19. Considering the return on investment, to what extent is blockchain a good hedging instrument for minority investors? Using weekly trade price data from Yahoo Finance, market valuations from coinranking.com, and asset/equity variables from the Federal Reserve Bank, this paper examines investment strategies of different racial/ethnic groups in cryptocurrency during the pandemic in a panel data model from 2019 to 2021. Should investors use public coins such as Bitcoin and Ethereum as part of their investment portfolio mix during the pandemic? We find that an increase in the price of Bitcoin and other cryptocurrencies during the pandemic may repress the investment strategy for marginalized groups.

Keywords Financial Economics · Blockchain · COVID-19 · Portfolio diversification

JEL Classification G0 · G1 · G4

Introduction

The evolution of fintech and blockchain technology led to the emergence of Bitcoin and other cryptocurrencies. Presumably created in 2008 by a Japanese hacker, Satoshi Nakamoto, Bitcoin is one of the most famous types of virtual money (Cheah and Fry 2015). The inherent characteristics of blockchain architecture and design provide properties such as transparency, robustness, auditability, and security (Casino et al. 2019), which are favorable characteristics in achieving equity in wealth distribution.

Cryptocurrencies have been increasingly recognized as an emerging channel for private wealth accumulation despite the

risks of investors trading in highly volatile markets and often under unfavorable government scrutiny (Atkins et al. 2021). The two most prominent cryptocurrencies in the market are Bitcoin and Ethereum, which have provisioned a decentralized blockchain ecosystem to facilitate cryptographically secured peer-to-peer transactions for digital inclusion. The decentralized blockchain ecosystem that promises high returns for private wealth accumulation in highly volatile and risky cryptocurrency markets may be associated with a more complex interplay of social interactions with people and institutions. Trends and research indicate that the world population, both rich and poor, is increasingly attracted to the cryptocurrency markets. However, traditionally, the financial markets tend to favor high-income regions and marginalize low-income regions (Honohan 2008).

According to Weller and Hanks (2018), the widening racial wealth and inequality gap in the USA between Whites and minorities has increased over recent decades. Using the data from the Survey of Consumer Finances, Addo and Darity (2021) investigate the wealth holdings of Black, Hispanic, and White working-class households from the Great Recession to pre-COVID-19, the period that

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spanned 2010 to 2019. They find that, in terms of net worth, fewer Black working-class households benefitted from the economic recovery than White working-class households. Working-class households were less likely to be middle class as defined by their wealth holdings, while Black and Hispanic households were also less likely to be middle class. For Black households, racial identity is a strong predictor of wealth attainment in the occupational sector. Specifically, significant wealth disparities exist by age, education, marital status, income, and race despite persistent government policy and efforts to improve disparate outcomes.

The controversies on how to address wealth inequality continue. For example, although favorable arguments for increasing the rate of entrepreneurship to improve disparities exist, Kroeger and Wright (2021) believe that the economic cost of doing business would exacerbate the wealth disparity issue. Conversely, Darity and Hamilton (2017) argue that the racial wealth gap is rooted in socioeconomic and political structure barriers heralding from disdain for minority underachievement in education or financial literacy. The COVID-19 pandemic increased the wealth gap because billionaires in the USA have become unfathomably richer, while the poor are struggling to keep their homes (Taylor 2021). Minorities see fintech technology as a mechanism to close the persistent wealth gap. The wealth gap has been well researched, but the current empirical literature has not reached a consensus on how to address those inequalities.

Currently, Black and Hispanic investors, who have traditionally stayed away from the stock market, are finding digital coins more attractive because of their potential to address inequality (Zhang et al. 2020). The August 17, 2021, *USA Today Harris Poll* indicates that 23% of Blacks and 17% of Hispanics, as compared to 11% of White Americans, are currently investing in digital assets. Roşu and Saleh (2021) indicate random selection in the market for cryptocurrency can encourage equitable outcomes where rich and poor stakeholders are enabled to amass stable investment shares. It is possible that investment in digital coins may help to circumvent discriminatory practices that marginalized groups have historically experienced with financial institutions in the USA and change the wealth trajectory for minorities.

This paper explores cryptocurrency and digital asset investment during the COVID-19 pandemic among different demographics of investors and their portfolio choices. Over the past 2 years, many investors have reassessed their portfolio mix as traditional investment strategies may not be optimal. While portfolio diversification may be necessary to optimize the return for all investors, little is known regarding the portfolio strategies for emerging digital assets, especially within minority groups. The results in this study will inform the extent to which marginalized populations in the USA may benefit from asset allocation incentives. The “[Data and Methodology](#)” section of the paper examines the data

and presents our stylized capital asset pricing model and methodology. The “[Results](#)” section analyzes the result and decomposition of investment in cryptocurrency investment by race, and the “[Conclusion](#)” section concludes the paper.

Data and Methodology

In this study, we analyze investments across the top ten most popular cryptocurrencies from March 2019 to March 2021. We have constructed Table 1 with the top ten cryptocurrency rankings in January of 2020 and January of 2021 according to <https://www.coinranking.com>. Note that Bitcoin and Ethereum have increased in price and popularity, driven by secondary market demand incurred after initial coin offerings. Meanwhile, XRP and Tether remain the most consistently affordable cryptocurrencies across the 2-year span. In 2020, Bitcoin and Ethereum had an estimated market capitalization of \$162.54 billion and \$18.74 billion, respectively, as compared to \$541.12 billion and \$85.62 billion in 2021, respectively. Similarly, over the same period market value for Bitcoin increased from \$8937.25 to \$29,139.65 and Ethereum from \$171.17 to \$751.75. In terms of market capitalization and market value, Bitcoin and Ethereum have outperformed their peer assets within the last year but

Table 1 Top ten cryptocurrency rankings in January of 2020 and January of 2021

Top 10 Cryptocurrency a on January 27, 2021		
Name	2021 price	2021 market cap
Bitcoin	\$29,139.65	\$541.12 billion
Ethereum	\$751.75	\$85.62 billion
Tether USD	\$1.00	\$20.92 billion
XRP	\$0.22	\$10.11 billion
Litecoin	\$127.82	\$8.43 billion
Polkadot	\$8.18	\$7.34 billion
Bitcoin cash	\$354.47	\$6.57 billion
Cardano	\$0.18	\$5.76 billion
Binance coin	\$38.02	\$5.48 billion
Chainlink	\$11.71	\$4.66 billion
Top 10 Cryptocurrency on January 28, 2020		
Name	2020 price	2020 market cap
Bitcoin	\$8,937.25	\$162.54 billion
Ethereum	\$171.17	\$18.74 billion
XRP-ripple	\$0.23	\$10.17 billion
Bitcoin cash	\$363.37	\$6.63 billion
Bitcoin SV	\$281.63	\$5.13 billion
Tether	\$1.00	\$4.64 billion
EOS	\$3.91	\$3.72 billion
Litecoin	\$58.00	\$3.71 billion
Binance coin	\$17.59	\$2.74 billion
Cardano	\$0.05	\$1.3 billion

are also extremely expensive. The high price of these assets alludes to the need to explore the appropriate investment opportunities and portfolio mix in the COVID-19 policy environment. We address the marginal value of these assets in our regression estimates.

We apply the capital asset pricing model (CAPM) to determine the volatility associated with investment in cryptocurrency across race/ethnicity using panel data for the top 10 cryptocurrencies that were available at least by March 2019. The CAPM also explains how risk is rewarded, which can help determine how particular assets should be situated in a portfolio. Many investors aspire to diversify their assets because the portfolio return is based on portfolio risk. Our CAPM is specified below in Eq. (1):

$$E(R) = R_f\beta_1 + (R_m - R_f)\beta_2 + \varepsilon \tag{1}$$

All data is collected for the period beginning the first week of March of 2019 and ending the last week of March 2021. $E(R)$ is the expected return on an investment, which theory asserts can be equally determined from the opportunity cost of equity. Because of this theoretical assertion we employ equity shares holdings for Blacks, Whites, and Hispanics in the USA economy from the Board of Governors Distributional Financial Accounts. Since this data only reflects quarterly averages, these data are extrapolated. Therefore, each week is matched to its corresponding quarterly average value. For example, first quarter averages are listed as the weekly values in January, February, and March.

R_m , the market rate of return, is calculated using a simple growth rate formula based on weekly data from Yahoo finance daily closing prices. R_f is the risk-free rate of return captured by the 3-month treasury bill rate from the Federal Reserve Economic Database. The market risk premium ($R_m - R_f$) is calculated by subtracting the market rate of return (R_m) and the risk-free rate of return (R_f). The

coefficients β_1 and β_2 capture the marginal impact of the market return and market premium on the expected return, respectively. Specifically, the β_2 coefficient in our model is a measure of systematic risk and varies from 0 to ∞ , indicating the higher β_2 , the higher the risk in the portfolio.

In the second iteration of the CAPM, we estimate the same model from Eq. (1) using a COVID-19 binary event variables as shown in Eq. (2) below:

$$E(R) = R_f\beta_3 + (R_m - R_f)\beta_4 + COVD19\beta_5 + COVD19 * R_f\beta_6 + \varepsilon \tag{2}$$

The COVID-19 dummy variable assumes a value of one for weeks beginning March 2020 through March 2021 and is zero otherwise. Also note, the risk-free rate of investment is interacted with the COVID-19 binary variables to capture interest rate policy movements in the COVID-19 environment. Specifically, movements in the interest rate during the COVID-19 pandemic can help us to understand investors' responses to policy movements during the COVID-19 pandemic recession.

Results

Tables 2 and 3 report the results of Eq. (1). In Table 2, we find evidence that a 1% increase in interest rates increases equity shares across races at the 99% level of confidence by between 0.02% and 0.03%. We also find evidence that Whites and then Hispanics experience the highest premium on equity shares and therefore are investing and receiving higher returns on riskier assets. Specifically, at the 99% level of confidence, the market security line coefficient is 0.0013% for Whites and 0.000231% for Hispanics. Blacks experience the lowest premium on equity with a market security line coefficient of 0.000115%, which is significantly different than zero at the 10% level of significance. The random

Table 2 CAPM equity shares across race and ethnicity

	White investors equity shares Pool RE FE			Black investors equity shares Pool RE FE			Hispanic investors equity shares Pool RE FE		
<i>T- Bill Rate</i>	0.0242*** (0.000)	0.0242*** (0.000)	0.0242*** (0.000)	0.0248*** (0.000)	0.0248*** (0.000)	0.0248*** (0.000)	0.0302*** (0.000)	0.0302*** (0.000)	0.0302*** (0.000)
<i>PREMIUM</i>	0.00130*** (0.000)	0.00130*** (0.000)	0.00130*** (0.000)	0.000115* (0.079)	0.000115* (0.079)	0.000117* (0.077)	0.000231*** (0.000)	0.000231*** (0.000)	0.000234*** (0.000)
<i>Constant</i>	89.32*** (0.000)	89.32*** (0.000)	89.32*** (0.000)	1.103*** (0.000)	1.103*** (0.000)	1.103*** (0.000)	0.489*** (0.000)	0.489*** (0.000)	0.489*** (0.000)
<i>N</i>	1084	1084	1084	1084	1084	1084	1084	1084	1084
<i>R-sq</i>	0.040	0.040	0.040	0.276	0.276	0.276	0.356	0.356	0.356
<i>Within</i>		0.040	0.040		0.276	0.276		0.356	0.356
<i>Between</i>		0.371	0.371		0.580	0.563		0.101	0.093

p-values in parentheses (**p* < 0.10", ***p* < 0.05, ****p* < 0.01)

Table 3 CAPM asset shares across race and ethnicity

	<i>White investors asset shares</i>			<i>Black investors asset shares</i>			<i>Hispanic investors asset shares</i>		
	<i>Pool</i>	<i>RE</i>	<i>FE</i>	<i>Pool</i>	<i>RE</i>	<i>FE</i>	<i>Pool</i>	<i>RE</i>	<i>FE</i>
<i>T- Bill Rate</i>	-0.0755*** (0.000)	-0.0755*** (0.000)	-0.0755*** (0.000)	0.0291*** (0.000)	0.0291*** (0.000)	0.0291*** (0.000)	0.0658*** (0.000)	0.0658*** (0.000)	0.0658*** (0.000)
<i>PREMIUM</i>	0.009054*** (0.000)	0.000954*** (0.000)	0.000957*** (0.001)	0.0000810 (0.232)	0.0000810 (0.232)	0.0000865 (0.207)	-0.0000480 (0.633)	-0.0000480 (0.633)	-0.0000459 (0.652)
<i>Constant</i>	82.73*** (0.000)	82.73*** (0.000)	82.73*** (0.000)	4.551*** (0.000)	4.551*** (0.000)	4.551*** (0.000)	2.830*** (0.000)	2.830*** (0.000)	2.830*** (0.000)
<i>N</i>	1084	1084	1084	1084	1084	1084	1084	1084	1084
<i>R-sq</i>	0.188	0.188	0.188	0.329	0.329	0.329	0.535	0.535	0.535
<i>Within</i>		0.187	0.187		0.329	0.329		0.535	0.535
<i>Between</i>		0.7500	0.750		0.871	0.848		0.995	0.996

p-values in parentheses (**p* < 0.10, ***p* < 0.05, ****p* < 0.01)

effects (RE) and fixed effects (FE) models are best specified for Whites and Blacks since the between *r*-squared is approximately 0.4 for Whites and 0.6 for Blacks, and thereby, the between *r*-squared is reflective of the benefits of diversification strategies resulting from the CAPM. Hispanics do not benefit from the diversification of cryptocurrencies but rather the pooling of cryptocurrency since the overall *r*-squared for their regressions is 0.356. This outcome is possible because Hispanics hold the smallest amount of equity shares as a new established group in the USA and therefore exhibit more indifference to various types of cryptocurrencies.

In Table 3, we examine Eq. (1) by acknowledging equity shares as a subcategory of asset shares to determine if our results are valid. We find evidence that a 1% increase in interest rates increases asset shares for Blacks and Hispanics at the 99% level of confidence by 0.03% and 0.07%, respectively. In contrast, a 1% increase interest rates reduce asset shares by 0.07% for Whites at the 99% level of confidence. We also find evidence that only Whites experience a premium on asset shares that is significantly more than zero. Specifically, at the 99% level of confidence, the market security line coefficient is 0.000957. Note that this CAPM performs better in this asset shares model. Whites have an overall *r*-squared of 0.188, Blacks have an overall *r*-squared 0.329 and Hispanics have an *r*-squared of 0.535 across all pooled, random effects, and fixed effect regression. When analyzing the pooled, RE, and FE models, we find between *r*-squared values of approximately 0.75, 0.8, and 0.99, for Whites, Blacks, and Hispanics, respectively.

Together, Tables 2 and 3 deliver a few key points. First, we learn that all three groups benefit from premia on cryptocurrency resulting in additional holdings of equity shares. Then we learn the pecking order for who benefits from most to least are Whites, Hispanics, and then Blacks. We also learn that the diversification strategy across cryptocurrencies

breaks down for Hispanic holdings of equity shares, and this finding is probably because Hispanics are not as established in the USA as a competitive investment group relative to other ethnic groups and they hold less joint equity. In addition, we learn that Whites are the only group that experience positive premia returns to assets resulting from investment in cryptocurrency in a low interest rate environment. This finding indicates that Whites have more wealth to invest in cryptocurrency than the other groups. Finally, we learn that the CAPM specification is best captured in the random effects and fixed effects models where we account for the diversification between assets, except in the case of Hispanic equity share holdings.

In Table 4, we examine Eq. (2), which is our CAPM model that accounts for interactions between the COVID-19 binary variable and the interest rate variable. We find evidence that a 1% increase in interest rates increases equity shares for Whites, Blacks, and Hispanics at the 99% level of confidence by 0.381%, 0.06%, and 0.141%, respectively. We also find evidence that only Whites experience a premium on equity share holdings at the 99% level of confidence of approximately 0.0005%. Blacks and Hispanics experience a premium at the 90% level of confidence of approximately 0.00013 and 0.00009%, respectively. In addition, all groups experienced an increase in equity holdings at the 99% level of confidence during the COVID-19 pandemic. Equity shares increased by 0.82, 0.06, and 0.235 for Whites, Blacks, and Hispanics, respectively. However, the interaction term indicates that at the 99% level of confidence only Whites and Hispanics benefited from being in a low interest rate environment during the COVID-19 pandemic; a 1% decline in the interest rate during COVID-19 increased equity shares by 1.067 and 0.38% for Whites and Hispanics, respectively. On the other hand, a 1% decline in interest rates in the COVID-19 pandemic reduced equity shares for Blacks by approximately

Table 4 CAPM equity shares in COVID-19 environment

	<i>White investors equity shares</i>			<i>Black investors equity shares</i>			<i>Hispanic investors equity shares</i>		
	<i>Pool</i>	<i>RE</i>	<i>FE</i>	<i>Pool</i>	<i>RE</i>	<i>FE</i>	<i>Pool</i>	<i>RE</i>	<i>FE</i>
<i>T- Bill Rate</i>	0.381*** (0.000)	0.381*** (0.000)	0.381*** (0.000)	0.0600*** (0.000)	0.0600*** (0.000)	0.0600*** (0.000)	0.141*** (0.000)	0.141*** (0.000)	0.141*** (0.000)
<i>PREMIUM</i>	0.000499*** (0.009)	0.000499*** (0.009)	0.000499*** (0.010)	0.000136** (0.030)	0.000136** (0.030)	0.000139** (0.027)	0.0000910** (0.047)	0.0000910** (0.047)	0.0000924** (0.046)
<i>COVID(= 1)</i>	0.822*** (0.000)	0.822*** (0.000)	0.822*** (0.000)	0.0620*** (0.000)	0.0620*** (0.000)	0.0620*** (0.000)	0.235*** (0.000)	0.235*** (0.000)	0.235*** (0.000)
<i>COVID*T- Bill Rate</i>	-1.067*** (0.000)	-1.067*** (0.000)	-1.067*** (0.000)	0.0754*** (0.000)	0.0754*** (0.000)	0.0755*** (0.000)	-0.138*** (0.000)	-0.138*** (0.000)	-0.138*** (0.000)
<i>Constant</i>	88.60*** (0.000)	88.60*** (0.000)	88.60*** (0.000)	1.031*** (0.000)	1.031*** (0.000)	1.031*** (0.000)	0.265*** (0.000)	0.265*** (0.000)	0.265*** (0.000)
<i>N</i>	1084	1084	1084	1084	1084	1084	1084	1084	1084
<i>R-sq</i>	0.489	0.489	0.489	0.351	0.351	0.351	0.698	0.698	0.698
<i>Within</i>		0.489	0.489		0.351	0.351		0.698	0.698
<i>Between</i>		0.630	0.630		0.416	0.397		0.659	0.648

p-values in parentheses (* $p < 0.10$ ", ** $p < 0.05$, *** $p < 0.01$)

0.075%. Note, these policy relevant CAPM specifications perform better than the regressions as reflected in Eq. 1 on Table 2. The overall *r*-squared values for Whites, Blacks, and Hispanics are approximately 0.49, 0.35, and 0.70 respectively. The between *r*-squared for Whites, Blacks, and Hispanics is approximately, 0.63, 0.4, and 0.65, indicating, again, that Hispanics are better off pooling their cryptocurrency than diversifying it.

The marginal knowledge gains from Table 4 are straightforward. In Table 2, we reinforce that pooling, as opposed to diversifying cryptocurrency, is an investment strategy that can improve equity share holdings for Hispanics. Our findings indicate all races may earn a premium on equity shares when they invest in cryptocurrency and have experienced increases in equity during the COVID-19 pandemic. This outcome is offset by the lack of profitability in cryptocurrency that Blacks experience in the low interest rate environment. In fact, the evidence provided here implicates cryptocurrencies as a hedging instrument for Whites and Hispanics but not for Blacks. This result possibly reflects existing barriers to investment markets for Blacks as well as wealth disparities.

Conclusion

The central aim of this paper is to assess investment patterns across racial/ethnic groups during the COVID-19 pandemic. We find that on average, Whites benefit most, followed by Hispanics, and then Blacks, from investing in cryptocurrency over time as well as during the

COVID-19 pandemic. Whites are the only group that experience positive premia on assets resulting from investment in cryptocurrency in a low interest rate environment in any period, and we believe this is because they have more wealth and relatively more risk tolerance for investing in cryptocurrency. We also find that pooling, as opposed to diversifying cryptocurrency, to improve equity share holdings is a better strategy for Hispanics. Hispanics are not as established in the USA as a competitive group of investors because they hold less joint equity. However, diversification is a better strategy for Black and Whites. Finally, we provide evidence that cryptocurrency is a hedging instrument for Whites and Hispanics in COVID-19, but not for Blacks in the COVID-19, low interest rate environment. We attribute this last result to existing barriers for Blacks engaging in investment markets as well as wealth disparities.

Our findings support that policies should be constructed so wealth disparities can be adequately addressed in the cryptocurrency market. According to Zhang et al. (2020), such inequalities can be addressed by means of a coin offering with equitable distribution, supply, and rewards for early investors. In addition, cryptocurrency mining power is quite concentrated, and there is a need to address inequalities in stakeholder constituencies (Arnosti and Weinberg 2019). Policy regulation in this market should be constructed so that transparency among cryptocurrency miners will encourage equitable access among investors. Most evidently, Bitcoin and Ethereum are expensive and scarce (Brown-Cohen et al. 2019; Fanti et al. 2019), making them difficult for marginalized groups to acquire. In

contrast, the affordability and stability of Ripple and Tether in recent years are impressive, but the returns are stable at a lower value and less risky. Therefore, it may be helpful for cryptocurrency pricing and returns to be bounded.

Finally, all investors must consider that for an excessively bullish market with high returns, it will be difficult for some, if not most, demographics to participate in this space or market. This is because stock prices will be excessively high and crowd out those with existing wealth and income disparities, particularly minorities. However, there is an opportunity to encourage a more diverse population of participants before the market expands. Since cryptocurrency is viewed as a diversifiable asset across demographics but has only truly helped asset and equity among Whites, the lack of concern for cryptocurrency expansion could exacerbate racial wealth inequality. In essence, Black American households and Hispanic households may want to be more prudent about their investment in cryptocurrency. Additionally, this research provides evidence Black Americans stand to lose equity in low interest rate environments and Hispanics stand to lose out on investments because of the relative volume of equity available for them to invest in the risky assets. Nonetheless, if these groups can hold policymakers accountable as the market for cryptocurrency develops, then the expansion of cryptocurrency can lead to distribution and inclusion that is equitable and fair (Somwanshi 2019), especially as holdings reach critical mass. Otherwise, cryptocurrency is not a safe hedging instrument or investment across racial/ethnic groupings.

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Data Availability The datasets analyzed during the current study are available in the with Yahoo Finance (<https://finance.yahoo.com/>), Federal Reserve Distributional Financial Accounts (<https://www.federalreserve.gov/releases/z1/dataviz/dfa/distribute/table/#quarter:128;series:Assets;demographic:race:population:all;units:levels>), Federal Reserve Economic Database (<https://fred.stlouisfed.org/>), and Coin ranking (<https://www.coinranking.com>).

Declarations

Conflict of Interest The authors declare no competing interests.

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