Crypto Currencies – Does it deserve to be included in the portfolio?

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Abstract
Over the past decade and a half, cryptocurrencies have attracted growing attention from investors, financial institutions, and regulators, raising fundamental questions about their economic role and investment relevance. Despite their nomenclature, cryptocurrencies do not satisfy the defining characteristics of fiat currencies, yet their rapid market expansion and distinct return behavior suggest potential relevance for portfolio construction. This study empirically evaluates whether cryptocurrencies constitute a distinct asset class rather than a form of currency. Using established asset class definitions proposed by Sharpe (1992), Greer (1997), and Kinlaw et al. (2017), we examine cryptocurrencies along dimensions that include internal coherence, cross-asset similarity, investability, and portfolio contribution. Our results indicate that cryptocurrencies exhibit strong commonality within the group, low correlation with traditional asset classes, and diversification benefits when included in multi-asset portfolios. Portfolio tests further show that the inclusion of cryptocurrencies improves risk-adjusted returns, albeit with substantially higher volatility.

Overall, the evidence supports the classification of cryptocurrencies as an emerging asset class rather than as a currency substitute. While uncertainty regarding regulation, market structure, and long-term adoption remains, cryptocurrencies appear to possess characteristics consistent with alternative investments and warrant consideration within the broader asset-allocation framework.

Keywords: Asset Class Definition, Alternative Investments, Portfolio Diversification, Crypto Currency Returns, Crypto Currencies as Asset Class; JEL Classification: G10, G11.

1. Introduction

US Federal Reserve made quantitative easing in 2008 to address sub-prime crisis. However, the quantitative easing carried through expansion of Federal Reserve balance sheet brought concerns on UD dollar as a 'store of value". This concern led to birth of crypto currencies using blockchain technology. Bitcoin was born in Jan 2009 as the first crypto currency and started trading in August 2010 with initial trading value of 10 cents.

Early 2025, Bitcoin price touched $100K with a market cap close to $2T. This is almost 1 million times rise in price in 15 years. Popularity of bitcoin led to launch of many crypto currencies (crytpos). As of Q1 2025, there are more than 10,000 cryptos with a total market cap of $3.2T (Source: Infinite Market Cap). Many cryptos are illiquid and have a very low market cap. It's the top few crypto currencies constituting the majority of the crypto currency market cap that are attractive to the investor communities.

The rising popularity and valuation of cryptos makes it a choice for an investment. It is no longer a small market cap to ignore. Crypto market cap of $3.2T compares well to the top four precious metals Gold, Silver, Platinum and Palladium with market cap of $19.5T, $1.8T, $0.25T and $0.18T respectively (source: Infinite Market Cap, Data as on 17Feb2025). This makes cryptos bigger than non-gold top precious metals trading in the market and behind gold only.

There is growing debate whether crypto is a currency or an asset. To qualify for currency, the instrument has to be a unit of account, store of value and a medium of exchange. Many central banks have different views on cryptos. China had outright banned it. Most nations part of European Union do not accept it as a legal tender. US and India both neither reject it nor fully legitimize it. Per Kim, Sarin and Vaddi (2018), some payment transactions do happen in few selected countries like France, Japan, Philippines, Poland, Singapore, Switzerland and USA. As of today, most Crypto currencies are trading with no backing from central banks and no explicit government support. Lack of legitimacy from government is a major hindrance for cryptos in qualifying as an asset class. However, the extremely high returns on crypto currencies, albeit high volatility, had made it an attractive asset for inclusion into one's portfolio. The purpose of this paper is to evaluate cryptos as a currency; evaluate it through the established framework of an asset class; and explore the benefits of its inclusion into one's portfolio.

2. Crypto Currencies Evolution and Market Size

2.1 Historical Development

With the presence of no currency in ancient times, humans started most transactions with the barter

system. Slowly humans started using precious metals, gems and stones as currencies. Gold became extremely popular as a currency due to (a) Durability – does not rust or usually react with any other material (b) Malleability – can be formed into any shape easily for storage and transportation (c) Inherent scarcity – not easy to mine and produce. Since the 17th century, countries started introducing their own currencies including paper currencies backed by physical gold holdings.

The then US President Franklin D Roosevelt abandoned the gold standard in domestic market by delinking USD from gold in 1933 during great depression to stop citizens hoarding gold and urged them to deposit it in the banks. In 1971, the then US president Nixxon made the final delinking by stopping convertibility of USD to gold in the international market. Over time, most other countries moved to paper currencies and delinked from gold standards but backed it through sovereign guarantee. This provided the incumbent governments flexibility to manage money supply by issuing more paper currencies as and when needed, albeit losing its value in the international market and risking inflation in the domestic market.

2.2 Crypto Market Size

Exhibit-1: Top 10 crypto currency with market cap and last 24 hours trade value as on 28Feb2025

Sr. No.	Crypto Currency Name	Market Cap ($B)	Percentage Market Cap	Daily Trade ($B)	Percentage Daily Trade
1	Bitcoin	1,700	60.5%	26.07	19.4%
2	Ethereum	269	9.6%	16.09	12.0%
3	Teether USDt**	142	5.1%	56.60	42.2%
4	XRP	132	4.7%	3.21	2.4%
5	BNB	87	3.1%	1.60	1.2%
6	Solana	73	2.6%	2.74	2.0%
7	USD Coin**	56	2.0%	5.01	3.7%
8	Dogecoin	31	1.1%	1.05	0.8%
9	Cardano	23	0.8%	0.59	0.4%
10	TRON	20	0.7%	0.43	0.3%
11	Others*	267	9.5%	20.80	15.5%
	Total	2,810	100.0%	134.19	100.0%

*Others include 10,839 crypto currency data

**Tether USDt and USD Coin are "Stable Coins" in nature and pegged to USD at 1:1 ratio

Source: https://uk.investing.com/crypto/currencies.

There are 10,849 crypto currencies with a market cap of $2.81T as of 28Feb2025. Many of these crypto currencies are illiquid with hardly any daily transaction. Most of the market caps are concentrated with a few crypto currencies with the top 10 cryptos constituting more than 90% of the crypto market cap (refer exhibit-1). Bitcoin and Ethereum are the top two crypto with market cap of $1.7T (60.5% of total crypto market cap) and $268.8B (9.6% of total crypto market cap) respectively. As Bitcoin has a dominant position, analysis and evaluations are concentrated on Bitcoin for practical purposes. In a few cases, Ethereum is also included in analysis. Crypto currencies are evaluated as an asset class through 3 major asset class definitions.

3. Evaluation of Cryptos as Currency:

Cryptos are evaluated against some key criteria to verify their fitness as a currency.

Exchangeable or Fungible: Any currency must be acceptable for exchange against goods and services. It does not need to be revalued for each transaction. Cryptos are hardly being used to transact for any purchases across the world. Barring few transactions allowed in few countries, it is hardly used for payments. Hence, cryptos certainly don't meet this criterion of a currency.

However, Marc Andreessen (2014) argued in his New York Times article that cryptos are likely to catch up soon. Bank credit cards usually charge 1-2% per transaction while Crypto transactions fees are relatively low. Immigrant labor may use Bitcoin to remit money to their home countries. While most banks charge 3-10% for remittances to unbanked immigrants, sending cryptos is seamless and low cost.

Durability: A currency must hold its value for many exchanges over a reasonable amount of time. Most crypto currencies are illiquid and hardly traded. Only a few top currencies are traded on a regular basis. Additionally, the values of crypto currencies are extremely volatile. For example: The largest crypto currency Bitcoin lost its value from $61K in Oct'2021 to $16K in Dec'2022, a drop of over 70% value in 15 months. Recently, the value of bitcoin dropped from $105K on 19Jan2025 to $85K on 23Feb2025; a loss of nearly 19% value over two months (Source: www.investing.com). An empirical test is carried out

to check on the monthly fluctuation of few developed economy national currencies and few emerging market national currencies against US Dollar. The results are compared to the monthly fluctuation of the two top crypto currencies Bitcoin and Ethereum. The details are in exhibit-2. Bitcoin and Ethereum average monthly price fluctuations are at least 40X more than developed market currencies and at least 30X more against emerging market currencies. The standard deviations of top two cryptos are also near 20X more than the fiat currencies. These kinds of extreme swings in value of cryptos make them unsuitable to hold value over a short period of time.

Exhibit-2: Monthly currency value fluctuation against US Dollar, Period: Aug 2010 to Aug 2015

Sr. No.	Currency Name	Monthly Average Change	Standard Deviation
1	Euro	0.03%	2.39%
2	British Pound Sterling	0.05%	2.35%
3	Japanese Yen	0.33%	2.73%
4	Australian Dollar	0.13%	3.13%
5	Chinese Yuan	0.02%	1.21%
6	Indian Rupee	0.38%	2.05%
7	Bitcoin	14.55%	53.44%
8	Ethereum*	10.63%	38.04%

* Ethereum data from Apr 2026 to Aug 2025, Source: Author

Convenience: A currency must be convenient to carry and divide. Cryptos being digital are certainly easy to carry. The top crypto currency Bitcoin is traded up to the 4th decimal value of one unit. The 2nd highest Ethereum is traded up to 2nd decimal point of one unit. From this perspective, major crypto currencies certainly qualify the criteria as a currency. However, a 4th decimal Bitcoin (0.0001 of one Bitcoin) is worth nearly $8.61 and a 2nd decimal Ethereum (0.01 of one Ethereum) is worth nearly $22.21 (prices as of 28Feb2025, Source: www.investing.com). This makes crypto currencies lack the ability to meet small ticket size payments by retail customers. Marc Andreessen (2014) argued in his New York Times article that a Bitcoin transaction can go down to as low as 8th decimal of one bitcoin making it far lower than a penny to make small ticket transactions. While technical feasibility is possible, rising crypto prices would make need for division of cryptos a regular event.

Trustworthy: Parties involved in a transaction must recognize the currency and can confidently carry out the transaction. There are more than 10,000 crypto currencies in the market now. Barring few top crypto currencies, majority are unknown to general public and illiquid. General public is yet to understand and use cryptos in daily activity. From this perspective, Crypto currencies are lacking trust among the majority involved in any transaction.

Stable Supply: Supply of any currency in the market must be stable. Most cryptos have a cap on supply for sure. Bitcoin has a maximum supply cap of 21 million units. However, the rapid introduction of new crypto currencies in the market makes it vulnerable to excess supply. Many crypto currencies also have different degrees of capping around control. This makes the supply of cryptos ambiguous.

Unit of Account: Measurement of a currency can be made in specific units and can be compared among each other. Crypto currencies are certainly measurable as units and each unit of same crypto currency is identical to each other. From that perspective, the top crypto currencies that are liquid certainly qualify to be a currency, But the vast majority of illiquid crypto currencies fail to meet those criteria due to significant differential valuation.

Reserve Bank of India bulletin dated 17Mar2022 brought the concerns raised by many central banks about crypto currencies. Any currency issued is backed by respective sovereign guarantees. Larger the size of country's economy and transparency in governance, stronger is the credibility of the country's currency in the international market. Currencies issued by central banks do appear as liability in central bank's balance sheet. However, crypto currencies appear as liability in no one's balance sheet. Crypto ownership is opaque, and pricing is speculative. There is no recourse in case of any error or mistake. Central banks shared concerns that cryptos could be a medium of payment in illegal trades like drug trafficking and terrorism. It can bypass the complete banking system and move across geographies without the scrutiny of law enforcement agencies. For this paper, no credible information was

found on the degree of crypto currencies being used as payment in these illegal transactions. Marc Andreessen (2014) argued in his New York Times article that crypto senders and receivers are quasi anonymous. They can be tracked like the way law enforcement agencies track emails sent. However, it is reasonable to conclude cryptos currently lack the criteria to meet legal payment requirements.

Crypto currencies, in spite of being labeled as currencies, fail to meet most criteria of a currency. In the next section, their viability as an asset class is explored.

4. Evaluation of Cryptos as Asset Class

Cryptos are evaluated as an asset class against the 3 established asset class definitions by Sharpe (1992), Greer (1997) and Kinlaw et al (2017). Both qualitative and quantitative evaluation are made against each criterion as and when appropriate.

4.1 Evaluate Crypto as an asset class through Sharpe's asset class definition:

Sharpe (1992) proposed that an asset class must fulfill 3 major criteria – (a) mutually exclusive to other asset classes (b) exhaustive within the asset class and (c) must have meaningful return.

4.1.1 Mutually Exclusive:

An asset class needs to be mutually exclusive to other asset classes. It mathematical terms the value of the asset class needs to have a low correlation of returns with other asset classes. Empirical test is made to identify the correlation of monthly returns of top two crypto currencies – Bitcoin and Ethereum for the period Aug 2020 to Aug 2025 with major financial asset classes S&P 500, Nasdaq 100, Bond Index, Commodity Index, Gold, Silver, REIT and Crude Oil. The results are in exhibit-3.

Exhibit-3: Multi-collinearity of monthly returns of asset classes, period: Aug2020 to Aug2025

	S&P500	Nasdaq 100	Bond	Commodity	Gold	Silver	REIT	Crude	Bitcoin	Ethereum
S&P500	100%									
Nasdaq 100	-14%	100%								
Bond	67%	-5%	100%							
Commodity	-1%	20%	-16%	100%						
Gold	1%	6%	5%	12%	100%					
Silver	-6%	26%	-6%	40%	67%	100%				
REIT	-12%	73%	-6%	31%	17%	21%	100%			
Crude Oil	-1%	12%	-8%	75%	-21%	8%	15%	100%		
Bitcoin	-28%	**52%**	-14%	20%	4%	13%	40%	12%	100%	
Ethereum	-17%	**64%**	-11%	24%	-5%	14%	49%	13%	**70%**	100%

Source: Author

At a high level, it is observed that Bitcoin and Ethereum have very low correlations among other asset classes except with Nasdaq 100 index. The correlation with Nasdaq 100 was high and also significant at 5% level, indicating crypto currencies are being perceived as technology products. The low correlations among other asset classes make cryptos asset class extremely attractive to an investor from the portfolio risk minimization perspective.

Pele et al (2023) brought a contrarian point that most of the low correlations of crypto currencies with other asset classes were mostly due to long tail price and long tail return values. Drop in volatility with higher adoption and maturity of the asset class may reduce long tail effect. Liu et all (2018) carried out a similar analysis both in US and China market. They compared three crypto currencies (Bitcoin, Ripple and Ethereum) performance with stocks, currencies and precious metals. They observed very low correlations of these cryptos with the other asset classes. They attributed the low correlation to their findings that crypto prices were based on momentum and investor attention. In spite of the criticism above, cryptos do exhibit a very low correlations with other asset classes and do meet the first criteria set by Sharpe.

4.1.2 Exhaustiveness within the asset class:

An asset class needs to represent as many similar assets as possible within the same asset class and the values of the similar assets within the asset class need to be highly correlated. There are more than 10K

cryptos in circulation. These cryptos are getting traded in more than 250 exchanges. While many cryptos are illiquid and have very low trading volume, few top cryptos have strong trading volumes and values. Top 8 crypto currencies based on market cap and daily trading volumes are selected. Tether USDt and USD Coin are dropped from the list as these are stable coins in nature and pegged to USD at 1:1 ratio. The multi-collinearity of these crypto currencies month over month returns for the period Aug 2020 to Aug 2025 are in exhibit-4. All correlations are significant at 10% level, barring correlations among Bitcoin with Dogecoin and BNB with XRP. Most correlations are more than 40% showing strong correlations among the crypto currencies. The top 2 crypto currencies, Bitcoin and Ethereum exhibited a correlation value of 0.702. This indicates that cryptos have very high homogeneity among themselves and brings exhaustiveness within the asset class. This makes cryptos meet Sharpe's 2nd asset definition criteria.

Exhibit-4: Multi-collinearity of monthly returns of top cryptos, period: Aug2020 to Aug2025

	Bitcoin	Ethereum	XRP	BNB	Solana	Dogecoin	Cardano	TRON
Bitcoin	100.0%							
Ethereum	**70.2%**	100.0%						
XRP	38.4%	60.1%	100.0%					
BNB	41.5%	28.0%	13.9%	100.0%				
Solana	44.5%	58.0%	38.9%	58.7%	100.0%			
Dogecoin	19.6%	56.7%	59.9%	23.0%	50.1%	100.0%		
Cardano	50.5%	47.4%	54.0%	70.2%	62.5%	32.8%	100.0%	
TRON	43.4%	46.2%	38.7%	43.3%	54.2%	24.4%	34.3%	100.0%

Source: Author

4.1.3 Meaningful Return:

An asset class needs to generate reasonable returns for the owner to be worth consideration among other asset classes. In mathematical terms, an asset class becomes attractive only when it either provides higher return or lower risks or both. The returns of top two crypto currencies (Bitcoin and Ethereum) are empirically tested with major asset classes S&P 500 Total Return Index, Nasdaq 100 Total Return Index, Bond Index, Commodity Index, Gold, Silver, REIT and Crude Oil. The average monthly return, standard deviation of the return, minimum monthly return, maximum monthly return and Sharpe's ratio for the asset classes for the period Aug 2020 to Aug 2025 are in exhibit-5.

It may be noted that both Bitcoin and Ethereum have very high returns compared to other asset classes. However, these high returns come with extreme high volatility (high standard deviation too). When the returns were compared on a risk adjusted basis through Sharpe ratio, Bitcoin and Ethereum exhibited high risk adjusted return against other asset classes. Hence, cryptos meet the 3rd criteria of an asset class. Overall, it is reasonable to conclude that the Cryptos meet all three criteria set by Sharpe to qualify as an asset class.

Exhibit-5: Monthly Returns of Asset classes, Period: Apr2016 to Aug2025

Sr. No.	Asset Class	Monthly Min Return (%)	Monthly Max Return (%)	Monthly Avg. Return (%)	Standard Deviation of Return (%)	Sharpe Ratio*
1	S&P500	-12.35%	12.82%	1.30%	4.45%	**0.25**
2	Nasdaq 100	-13.24%	15.49%	1.54%	5.30%	**0.26**
3	Bond	-7.47%	5.64%	0.28%	1.99%	0.05
4	Commodity	-16.99%	13.35%	0.81%	4.22%	0.15
5	Gold	-7.79%	10.30%	1.00%	3.84%	0.21
6	Silver	-17.31%	30.46%	1.16%	8.09%	0.12
7	REIT	-22.19%	11.60%	0.25%	5.19%	0.01
8	Crude Oil	-54.24%	88.38%	1.27%	13.12%	0.08
9	Bitcoin	-37.32%	70.38%	7.13%	21.52%	**0.32**
10	Ethereum	-53.79%	213.49%	10.63%	38.04%	**0.27**

*Sharpe Ratio calculated with risk free treasury rate for 0.1795% per month (Annualized 2.17%)
Source: Author

4.2 Evaluate Crypto as an asset class through Greer's asset class definition:

Greer (1997) brought a different point of view compared to Sharpe's asset class definition. Greer opined that there are only three investable super asset classes. He made a distinction between normal assets vs. investable assets and focused on investable assets. Initially, he created super asset classes and

allowed subsets of these super asset classes as separate asset classes.

Greer opined that assets under an asset class need to have similar risk characteristics. This is in contrast to Sharpe's definition of assets under an asset class are homogeneous (high correlation on price) and heterogeneous across asset class (low correlation between asset classes). Greer proposed three super asset classes as outlined below. Cryptos were checked against the 3 super asset classes definitions outlined by Greer.

4.2.1 Capital Assets

Greer defined capital assets are assets capable of bringing ongoing cash flow to the owner. Prices for majority of these asset classes can be determined through 'Discounted Cash Flow" method. The price of an asset is determined by the present value of the expected future cash flow discounted at an appropriate discount rate. The discount rate is a factor of risk inherent to the cash flow from the asset. Typically, all equity, bonds, real estate, derivatives etc. all fall into this category. Greer mentioned that this super asset class could be further divided into separate asset classes like equity, bonds, real estate as the risk factors are similar to being part of one super asset class and somewhat different among themselves to be called a separate asset class.

Cryptos bring no ongoing cash flow. One cannot use "Discounted Cash Flow" method to arrive at the value of a Crypto. Cryptos certainly don't meet this criterion as an asset class.

4.2.2 Consumable or Transformable Assets (C/T Assets)

Greer classified these assets that bring utility value to the owner. These assets are directly consumed or consumed through some transformation. Example: Copper is directly consumed. Crude Oil is consumed post transformation through refining. The values of these assets are determined through regular demand and supply in the market and the degree of utility they bring. Most commodities, barring the commodity derivatives which fit into this capital assets definition, fall into this asset class.

Cryptos have no utility value. It can neither be consumed directly nor indirectly through some transformation. Gold falls into this category as it has some industrial use. Cryptos have no industrial usage. Hence, Cryptos do not fit into Greer's C/T asset class definition.

4.2.3 Store of Value (SOV) Assets

Greer defined these asset classes that either maintain or enhance value over time. The value of these asset classes cannot be determined through DCF method. These assets are also not consumed directly or indirectly. The values of these assets do appreciate over time. Most buyers hold it with the assumption that someone is going to pay more for the same asset in future. These assets are subject to speculation and can experience irrational exuberance sometimes due to limited supply. Most currencies, precious metals like gold, silver, and platinum fall into this category.

Cryptos certainly resemble this asset class. Supply is limited for most cryptos. Ownership is purely on the assumption that someone will pay more in future. Crypto prices are subject to speculation and do experience irrational exuberance from time to time. The only criticism is that assets considered as SOV need not have much downside risk during market turmoil. From exhibit-5 above, we observed that Bitcoin is nearly 4X more volatile than S&P 500 and nearly 6X volatile than Gold. This dilutes crypto fitment into SOV asset class definition to some extent but does not outright disqualify it. For all practical purposes, we can take cryptos as a "Store of Value" assets per Greer's asset class definition.

4.3 Evaluate Crypto as an asset class through Kinlaw et. al. asset class definition:

Kinlaw, Kritzman, Turkington, and Markowitz (2017) proposed a different and comprehensive set of parameters to define an asset class. Per Kinlaw et al (2017), an asset class is a stable aggregation of investable units that are internally homogeneous and externally heterogeneous, that when added to a portfolio raises its expected utility without benefit of selection skill, and can be accessed cost effectively in size. An asset class needs to fulfill the following 7 criteria to qualify as an asset class. In this section, cryptos are evaluated against these criteria.

4.3.1 Stable Aggregation:

An asset class needs to be reasonably stable in terms of its price movement. Any one-way strong movement with extreme uncertainty and volatility can make the asset class unworthy of investor attention. The important point here is that the asset class need not lose value significantly over time.

From exhibit-5, Bitcoin and Ethereum are observed to be 4 times and 8 times more volatile than S&P 500 respectively. However, these extreme volatilities of cryptos are accompanied by higher returns to compensate the investors. Holovatiuk (2020) summarized that an asset class internal structure needs to be stable; thus, not requiring the investors to make frequent changes in asset allocation. Frequent launches of new currencies certainly impact on the internal structure. However, the frequent launches of cryptos could be attributable to the newness of the asset classes and lack of regulatory control around it.

The new launches could become more stable in coming days with few selected cryptos garnering investor attention and choice-sets. Overall, the cryptos certainly meet the "Stable Aggregation" criteria of Markowitz.

4.3.2 Investability:

Investability of an asset class means any investor can directly invest in the asset class in the market without much friction. The real measure is the access to the market and liquidity of the asset class. Liquidity brings investor ability to quickly convert one asset class to another in short notice. Investors, both individuals and entity level, need not compromise on prices significantly to liquidate their holdings due to large volume order.

Barring few country specific restrictions, any investor can trade in crypto currencies. As of 2020, there are more than 250 exchanges that an investor can tap to trade crypto currencies. Exhibit-1 contains the daily trading volume of top 10 cryptos. The top 8 cryptos have a daily trading volumes in excess of one billion USD each and the total crypto currencies transactions hit $134B per day on 28Feb2025. This reasonably compares well with other asset class daily trading volume with Gold ($230B per day), US Treasury ($180B per day) and US Corporate Investable Bonds ($35B per day) as on 28FEB2025 (Source: World Gold Council). Cryptos therefore meet the 2nd qualification criterion as an asset class per definition outlined by Kinlaw et al.

4.3.3 Internal Homogeneity:

This is similar to Sharpe's asset class definition around exhaustiveness within the asset class under section 4.1.2. The findings indicated that crypto currencies do exhibit a strong correlation among themselves. This makes cryptos meet the 3rd criterion set by Kinlaw et al to qualify as an asset class.

4.3.4 External Heterogeneity:

This is similar to Sharpe's criterion on being Mutually Exclusive as mentioned under section 4.1.1. We had earlier observed that Cryptos do exhibit a low correlation with other asset classes; thus, qualifying the 4th criterion of asset class definition by Kinlaw et al.

4.3.5 Expected Utility:

As per this criterion, an asset class, when added to a portfolio, needs to make a significant contribution to the portfolio performance either through enhancing the overall portfolio returns or through reducing portfolio risk or a combination of both.

From exhibit-5, both Bitcoin and Ethereum are observed to provide better risk adjusted return in terms of Sharpe's ratio. Per Markowitz (1952), efficient portfolio frontiers can be built with the best possible combination of asset classes to minimize risk for a given level of return. We considered 6 major asset classes as mentioned earlier in exhibit-5: S&P 500 total return index, Nasdaq 100 total return index, Bond Index, Commodity Index, Gold and REIT. We built an efficient frontier model. As Bitcoin was the most popular cryptos and constitutes 60% of the market cap, we added Bitcoin as 7th asset class to the portfolio and rebuilt the efficient frontier. We compared the efficient frontier curve of 7 asset class portfolio with Bitcoin vs 6 asset class portfolio without Bitcoin (refer exhibit-6). The addition of Bitcoin as an asset class moves the efficient frontier outward indicating an investor is likely to have a better return for same level of risk. As the willingness of the investor to take risk increases, the material difference in incremental returns of the portfolio with Bitcoin is more pronounced.

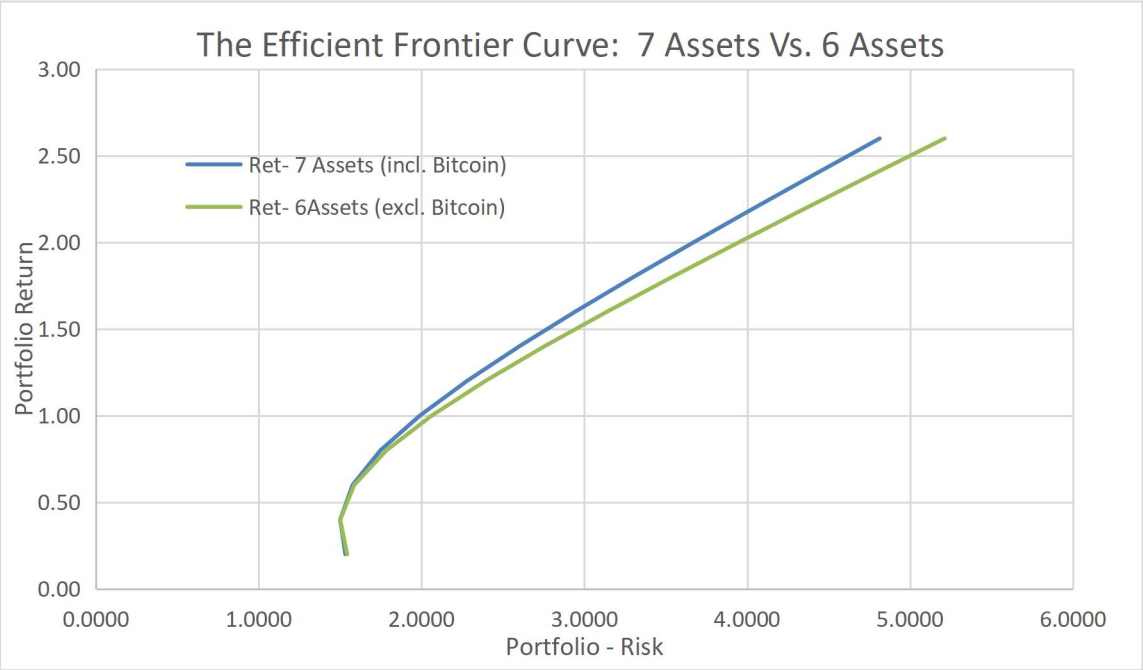

Exhibit-6: Efficient Frontier Curves using monthly returns and covariance of asset class returns, Period: Aug 2010 to Aug2025, Source: Author

However, Miller and Prondzinski (2023) studied the crypto currency as an asset class to diversify risk in portfolio for the period 2018-23. They found that Crypto Currencies return measured through Crypto Index CRIX is substantially different from US stock index S&P 500. However, when they compared the risk and return profile of CRIX with FAANG stocks (Facebook or Meta, Apple, Amazon, Netflix, Google or Alphabet), there were hardly any significant difference between in terms of Risk and Return. However, FAANG stocks certainly enjoy tangible revenue, cashflow and operate within regulated equity market, while cryptos lack that credibility. They opined that investors are better off with FAANG stocks compared to cryptos to mimic the portfolio risk and return with better diversification.

While Miller and Prondzinski (2023) criticism is valid in terms of replicating a portfolio similar to Cryptos using other assets, the qualification of cryptos to improve risk adjusted return of the portfolio certainly stands out and makes it attractive to portfolio managers to look for its addition to improve overall portfolio performance.

4.3.6 Selection Skill:

An investor need not have special skill to pick any asset from a given asset class. Any random selection of an asset class must bring expected utility to certain degrees though further optimization may need investor skill. Like other financial asset class indices, CRIX is becoming a very popular Crypto currency Index with a basket of Crypto currencies with a given set of weights. CRIX index is calculated and reported by S&P 500 since November 2021, and the historical data is calculated and reported since March 2018. An investor can buy ETFs and Index funds available in the market with CRIX as a benchmark index. There are plenty of other similar Index and ETFs like CMC Crypto 200, Bitcoin Index, Major Crypto Index, and Bloomberg Galaxy Crypto Index available in the market for an investor. An investor can pick one of the crypto index funds or ETFs to add to the portfolio and don't necessarily need any major selection skill to get the benefit of portfolio diversification and improved risk-adjusted return. This, in turn, makes Cryptos qualify the 6th criterion to be called as an asset class.

4.3.7 Cost Effective Access:

An investor can access the asset class such that neither the transaction cost is prohibitively high nullifying the expected returns nor the market need not be illiquid to prevent the investor from converting it to other asset classes as and when needed. We observed earlier that Cryptos do have sufficient liquidity in the market with an average daily trading volume of $134B. That meets the liquidity needs for an investor, at least for the top few cryptos. Transaction frictions are two types – first is the transaction cost investor needs to incur for a given transaction and the second one the bid-ask spread in trading that reduces investor's returns.

Kim, Sarin and Vaddi (2018) found that the Crypto transaction fees are quite comparable to other transaction fees. The flat fees per transaction are relatively low compared to the transaction values. For example, a flat transaction fee of $28 on a bitcoin value of upward of $100K is less than 3 basis points. In fact, the higher the transaction value, the lower the

impact due to flat fee structure. As the Cryptos market matures with volume and value, there is higher likelihood of transaction costs dropping further.

Holovatiuk (2020) indicated that the bid-ask spread of crypto currencies was around 4-8% during the period Aug 2014 to July 2019. This is certainly high, but as volumes start rising and the number of participants increases, the bid-ask spread usually drops. It's reasonable to accept that cryptos meet the 7th criterion of an asset class.

Overall, it was observed that Cryptos do meet all the 7 criteria of an asset class as set by Kinlaw et al. While there are concerns around risk, volatility, transaction cost, bid-ask spread etc., cryptos do meet the fundamental requirements to be called as an asset class.

5. Conclusions

This study evaluates cryptocurrencies by distinguishing their monetary attributes from their relevance as investment assets. When assessed against conventional criteria for currencies, namely stability as a store of value, legal recognition, liquidity, and widespread acceptance for transactions; cryptocurrencies largely fail to meet established standards. Extreme price volatility, uneven market depth, and limited legal tender status constrain their effectiveness as units of account and mediums of exchange. As such, cryptocurrencies currently lack the characteristics required to replace or meaningfully complement fiat currencies within existing monetary systems.

In contrast, an evaluation grounded in asset-class theory yields more favorable conclusions. Applying the asset-class frameworks proposed by Sharpe (1992), Greer (1997), and Kinlaw et al. (2017), this analysis finds that leading cryptocurrencies exhibit features consistent with an emerging alternative asset class. Although the broader cryptocurrency universe remains heterogeneous and includes many illiquid instruments, few top actively traded cryptocurrencies demonstrate relatively strong internal correlations and low correlations with traditional asset classes such as equities, fixed income, and commodities. These correlation properties provide meaningful diversification benefits. The efficient frontier curve in portfolio with crypto currencies also move leftward compared to portfolio without crypto currencies indicating allocations to crypto currencies enhances risk-adjusted returns benefits.

From an investability perspective, cryptocurrency markets have matured significantly. Trading infrastructures are expanding globally, access is improving across multiple exchanges, and transaction costs are declining. While concerns related to illiquidity, extreme valuation and regulatory risk remain, these challenges are not uncommon among alternative investments in earlier stages of development.

Professional opinion remains divided, reflecting the evolving nature of digital asset markets. Albeit initial hesitations, institutional participation is growing and regulatory framework is opening up for integration with financial systems over time. This study supports the view that cryptocurrencies should be evaluated primarily as an emerging alternative asset class rather than as prospective currencies. While not suitable for risk averse investors, it justifies inclusion in the portfolio for risk seeking investors with better risk-return profiles. Cryptocurrencies exhibit distinct return characteristics and diversification potential that justify their measured inclusion within diversified investment portfolios, consistent with the objectives of alternative investment strategies.

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