**Tema:** Análise da aplicação da teoria moderna de portifólio sobre o mercado das criptomoedas

**Problema de pesquisa:** Qual o impacto da utilização da moderna teoria de portfolio sobre o mercado de cripto ativos dado a alta instabilidade do mesmo

**Motivação:** O que me motivou a falar sobre a aplicação da moderna teoria de portfólio ao universo de criptomoedas, foi devido a vontade de aprender mais a fundo sobre o tema e aplicar sobre os meus investimentos os novos conceitos adquiridos, ou seja será algo que usarei diretamente após o TCC para otimizar os meus resultados financeiros e a possibilidade de reutilizar tal conhecimento para ideias de criação de d’Apps para ajudar aos demais investidores dessa plataforma cripto ativo

**Legendas:**

- Introdução

- Desenvolvimento

- Conclusão

Referencial teórico

In recent years, the cryptocurrency market has created a new benchmark in the financial world. More than two thousand2 cryp- tocurrencies are being traded in the market which relies on the same blockchain technology that is derived from Bitcoin or Other similar currencies. Furthermore, cryptocurrencies are unique and extensively complex compared to other financial markets because of the unique nature of each cryptocurrency. Stosic et al. [23] have previously studied the interactions to investigate whether correlations in the market of cryptocurrencies exhibit similar properties to those of other financial markets. Ankenbrand and Bieri [24] examined the financial characteristics of cryptocurrency markets have concluded that currently no consensus exists on their uniqueness as a market or whether there exist similarities to other asset classes (e.g. stocks, bonds, commodities or foreign exchange). .( CHAUDHARI, CRANE, 2020)

The exponential increase of Bitcoin and other cryptocurrencies have gained substantial attention in recent years. Bitcoin is a type of decentralized digital currency, where Decentralized means Bitcoin is peer-to-peer payment and is not regulated by any third party. Moreover, this cyptocurrency is independent of any Other commodity market in the world.( CHAUDHARI, CRANE, 2020)

Cryptocurrency is a form of digital currency (Dandapani, 2017) that is based on cryptography. Digital currency is “electronic money that serves as an alternative currency in digital or online transactions” (Dandapani, 2017, p. 614)(...). One can view cryptocurrency as digital currency that is built using encryption and decryption. Therefore, cryptocurrency is currency secured in its own vault using electronic puzzles and codes. Nonetheless, the concept of cryptocurrency and cryptography has been around for several years. Chaum (1983) suggested the use of cryptography within payment systems. This was to protect the user of electronic payment systems from their payment data being used by third parties. He proposed an untraceable payment system using blind signature systems. The object of these untraceable payment systems was to prohibit third parties from tracking the payment details, including the time, payee and number of payments made (LETHO, ALHASSAN, 2022)

a moeda oficial em uma economia deverá gozar de confiança perante os agentes econômicos. Aqui observa-se a volatilidade do Bitcoin agindo fortemente contra sua instalação como moeda oficial, pois, uma vez que contratos, salários, aluguéis e demais preços são estabelecidos em uma só moeda, a instabilidade monetária poderia ser causa de instabilidades jurídicas, econômicas e sociais .(BREUNIG, 2020)

Para que seja considerada uma moeda então, deverá esta gozar de capacidade de resguardar seu valor através do tempo, de maneira que o detentor da moeda não se sinta pressionado a gastar todo seu dinheiro no tempo presente por temer que no tempo futuro essa mesma quantia de moeda não mais gozará do mesmo valor. (...) é justamente a função reserva de valor que mais distancia o Bitcoin, na atualidade, de uma moeda, pois sofre com altíssima volatilidade de seu valor.(BREUNIG, 2020)

Tal como as ações da uma empresa, o Bitcoin tem seu preço atrelado ao mercado, e às forças de oferta e demanda. (BREUNIG, 2020)

Not all investable assets such as shares, bonds, real estate and commodities (to name a few) bear the same risks and returns (Markowitz, 1959; Shipway, 2009; Bodie et al., 2014). The concept of asset classes allows for grouping those investable assets that have similar risks and returns (Markowitz, 1959; Shipway, 2009; Bodie et al., 2014). Investing in multiple asset classes, also referred to as diversification, assists in managing risk in portfolio management, wealth preservation and hedging, making it of integral importance to investors (RAM, 2019)

The following represents an amalgamated list of criteria with which to evaluate an asset class:

* Investability including opportunities for passive investment and the availability of price and composition data.
* Politico-economic features and the inability to replicate the asset class, using Other assets.
* Close correlation of returns within the asset class and limited correlation with assets

outside of the asset class.

* Risk-reward profile including providing returns in excess of the risk-free rate (RAM, 2019)

the Metaverse of Mark Zuckerberg through NFT is increasing its digital footprint across social media.4 Literature also modeled NFT as a remarkable public success of blockchain technology (Dowling, 2021) with its unique right-transferring mechanism through digital assets. (KARIM et all. 2022)

Modern Portfolio Theory was developed by Harry Markowitz based on the approach that investors can construct portfolios investment to optimize or maximize expected return.(...)

Modern Portfolio Theory also quantify the benefits of diversification and explore how risk-averse investors construct portfolios to optimize expected returns against market risks, linking both the expected return (or mean) of a portfolio diversification return and the variance of portfolio returns as the investment risk (BAKAR, ROSBI. 2019)

The risk can be reduced by selecting assets with low positive correlation or negative correlation. There are five assumptions that underlying this theory. The assumptions are:

1. Investors consider each investment alternatives as being presented by a probability distribution of expected returns of over some holding periods.
2. Investors maximize one-period expected utility and their utility curve demonstrates diminishing marginal utility of wealth.
3. Investors estimate the risk of the portfolio on the basis of the variability of expected returns.
4. Investors’ base decision solely on expected return and risk, therefore their utility curves based on function of expected return and expected standard deviation.
5. For a given level of risk, investors prefer higher returns to lower returns. Similarly, for a given level of expected returns, investors prefer less risk to more risk.

The modern portfolio theory is constructed by two main equations which are expected return and variance for a portfolio investment. The expected rate of return for portfolio is weighted average of expected returns on the securities in the portfolio, as shown in Equation (BAKAR, ROSBI. 2019)

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