

Engaged Learning Fellowship Proposal

Name: [Ephraim Sun](#), [Laurens Gijbartsen](#)

Mentor's name: [Dr. Simon Mak](#)

1. Title

A Study on State-of-the-Art Alternative Asset Models and Their Application to Digital Assets

Subtitle: Examining State-of-the-Art Alternative Asset Models and Their Application to Digital Assets: A Comprehensive Study

Keywords: State-of-the-art, Alternative asset models, Digital assets, Cryptocurrency, Application, Feasibility, Effectiveness, Portfolio theory, Factor-based models, Risk management

2. Project Description

Main Research Question:

Can we adopt existing alternative asset investing models to digital assets?

Specific Questions:

- What existing alternative asset investing models are there for “traditional” asset classes?
- How do these investing models work?
- What are the key characteristics of different digital asset classes (e.g. cryptocurrencies, security tokens, utility tokens, NFTs etc.)? How do they compare to traditional alternative asset classes?
- What return and risk characteristics have different digital assets demonstrated historically? How do these compare to traditional alternatives?
- To what extent can existing alternative asset investing models be applied to digital assets?

3. Research Project Overview

This research project aims to conduct a comprehensive study on state-of-the-art alternative asset models and their application to digital assets. As the financial landscape continues to evolve, alternative assets, including digital assets, are gaining significant attention, and becoming increasingly relevant for investors. However, there is a lack of rigorous research and understanding of the various alternative asset investment models and their implications for digital assets.

The primary research question driving this study is: *"To what extent can existing alternative asset investing models be applied to digital assets?"* By examining and analyzing various alternative asset models, this research project seeks to assess the feasibility and effectiveness of applying these models to digital assets.

The final paper will begin with a comprehensive literature review, examining existing alternative asset models and their key principles. This review will provide a foundation for understanding the different approaches and strategies employed in alternative asset investing.

Next, the paper will delve into the digital asset landscape, exploring the unique characteristics and challenges associated with investing in digital assets. This section will provide insights into the distinct features of digital assets and the implications they may have on the application of alternative asset models.

The subsequent section will focus on the analysis of different alternative asset models and their potential application to digital assets. By studying a range of different alternative asset investing models, the paper will assess the extent to which these models can be adapted and utilized in the context of digital assets.

The analysis will consider factors such as volatility, liquidity, regulatory considerations, and technological advancements that impact the application of alternative asset models to digital assets. The research will identify the strengths and limitations of each model and provide recommendations for their use in digital asset investing.

To support the analysis, the paper will utilize empirical data & case studies to provide real-world examples of the application of alternative asset models to digital assets. These examples will illustrate the potential benefits & challenges associated with applying these models in practice.

Finally, the paper will conclude with a synthesis of the findings, highlighting the key insights, implications, & potential future directions for research in the field of alternative asset investing and its application to digital assets.

4. Background & Literature Review

Background

Digital assets have grown rapidly in recent years, with the total market cap of cryptocurrencies surpassing \$2 trillion in 2021. While digital assets hold promising investment opportunities, the volatile and decentralized nature of this new asset class presents unique investment challenges compared to traditional assets. As investor interest in digital assets continues to grow, there is a need to explore best practices for evaluating and managing risks associated with digital asset investments.

Alternative asset investing offers strategies that may help address some of the challenges with digital assets. However, applying traditional alternative asset models directly to digital assets is not straightforward given key differences in their characteristics. It is therefore important to examine existing models and understand how they may need to be adapted for the digital asset landscape.

Alternative Asset Models

A wide range of alternative asset investing models have been developed and applied across various private market asset classes such as private equity, private credit, real assets and hedge funds. Common models used include portfolio theory, factor models, mean-variance optimization, and risk parity frameworks.

While these models have proven valuable in traditional alternative investments, it remains unclear whether and how they can be applied to digital assets. Digital assets such as cryptocurrencies differ significantly from traditional assets in factors like volatility, liquidity profile and regulatory oversight (FINRA.org).

Digital Assets

Cryptocurrencies were the first widely adopted digital assets, with Bitcoin being the largest. Since then, new digital asset classes have emerged including security tokens representing asset ownership, and utility tokens providing access to a network or platform.

Digital assets present both opportunities and challenges from an investment perspective. While some studies show they can provide portfolio diversification benefits, their short history makes volatility and risk difficult to assess over long periods (FINRA.org). Regulatory ambiguity also introduces legal and compliance complexities for investors (CRS Reports, 2023).

Connecting these concepts, there is a need for research exploring whether and how existing alternative asset investing approaches could benefit the growth of a regulated digital asset investment industry. This paper aims to address this gap by systematically analyzing various models and evaluating their applicability to different digital asset classes.

5. Methodology

The objective of this research is to evaluate alternative asset investing models for traditional assets and assess their applicability to digital assets like cryptocurrencies. We plan to backtest various strategies over historical time periods to compare their risk and return characteristics.

Our first step will be to attend the [ETHDenver](#) conference to obtain guidance from industry experts on suitable cryptocurrency data sources, models and insight. This will help us broaden our understanding of the digital asset class. We will identify recommended Application Programming Interfaces (APIs) that can provide the necessary market data to include major cryptocurrencies in our analysis.

Once appropriate APIs have been selected, our next step will be to collect the relevant data for the alternative asset classes as well as the crypto currencies, from a period of January 2015 to December 2023, if available. This data will allow us to simulate the different models across the different alternative asset classes.

We will construct and backtest at least three different investing models for alternative asset classes. Relevant cryptocurrencies and traditional asset classes such as stocks, bonds and others will be included. Asset performance will be evaluated based on measures such as annualized returns, risk (standard deviation and maximum drawdown), and risk-adjusted returns using the Sharpe Ratio.

Our research methodology aims to provide empirical results on digital asset performance strategies through quantitative analysis & backtesting. Comparing the outcomes of different construction techniques will help identify best approaches for allocating to this new asset class.

Potential challenges, limitations or ethical considerations for this research could include:

Potential Challenges:

- Availability & quality of historical cryptocurrency data, as many coins have only existed for a short time
- Rapid evolution of the cryptocurrency market which may impact the validity of backtested results
- Computational resources and processing time required to backtest multiple strategies across large unstructured datasets

Ethical Considerations:

- Ensuring cryptocurrency data is acquired and used ethically and in accordance with the API terms of use
- Avoiding potential conflicts of interest when obtaining advice from cryptocurrency industry representatives

Limitations:

- Backtesting does not guarantee future performance and cannot account for Black Swan events caused by randomness in the markets
- Models may not generalize beyond the specific timeframe used for analysis
- Future cryptocurrency regulation or adoption trends could change the investment opportunity set

6. Timeline

The research project will be undertaken within a 2-3 month timeframe in order to produce timely findings.

In the *first month*, effort will be focused on compiling the necessary background work. A thorough literature review of existing academic literature on alternative asset models and digital assets will lay the groundwork. Based on gaps identified, the research objectives and questions will be clearly defined. Suitable data sources will also be selected to collect relevant historical market data on alternative assets and cryptocurrencies.

Month 2 will center around empirically evaluating the developed models. Backtesting of the algorithms on the alternative asset classes using the compiled data will be carried out. Performance outcomes across the different strategies will be analyzed and compared. An iterative approach will allow refinement of models based on initial results. Expert consultations will further strengthen model specifications and gather valuable industry perspectives. By mid-month, the optimal asset performance approaches will be identified. Preliminary conclusions on the applicability of alternative asset models to digital assets will also be drawn.

The subsequent weeks will involve completing additional backtests, statistical analysis of full results, and synthesizing implications. The final part of *Month 3* will focus on documentation. A research paper reporting the methodology, analyses, key findings and conclusions will be drafted. This will then undergo peer review to ensure rigor. Addressing reviewer feedback will yield a polished final paper. Preparation will also be made to disseminate salient results through an industry conference presentation.

7. Bibliography

- "Bitcoin Etf's Are Here to Stay: Expert." CoinDesk Latest Headlines RSS, www.coindesk.com/video/bitcoin-etfs-are-here-to-stay-expert/. Accessed 15 Feb. 2024.
- Beck, Stephen, et al. "Alternative Investments and Their Roles in Multi-Asset Class Portfolios." *Fidelity Institutional Insights*, Aug. 2023, institutional.fidelity.com/app/proxy/content?literatureURL=/9904817.PDF.
- Cryptocurrency: Selected Policy Issues, 15 Feb. 2023, crsreports.congress.gov/.
- Cumming, D., Helge Haß, L. and Schweizer, D. (2014), Strategic Asset Allocation and the Role of Alternative Investments. *Eur Financial Management*, 20: 521-547. <https://doi.org/10.1111/j.1468-036X.2012.00642.x>
- Damiano Brigo et al 2003 *Quantitative Finance* 3 173
- "Digital Assets." FINRA.Org, www.finra.org/investors/investing/investment-products/digital-assets. Accessed 23 Feb. 2024.
- Gava, Jérôme, and Julien Turc. "The Properties of Alpha Risk Parity Portfolios." *Entropy* (Basel, Switzerland) vol. 24,11 1631. 10 Nov. 2022, doi:10.3390/e24111631
- Livieris, I.E.; Pintelas, E.; Stavroyiannis, S.; Pintelas, P. Ensemble Deep Learning Models for Forecasting Cryptocurrency Time-Series. *Algorithms* 2020, 13, 121. <https://doi.org/10.3390/a13050121>
- Lozano, M., & Rubio, G. (2011). Evaluating alternative methods for testing asset pricing models with historical data. *Journal of Empirical Finance*, 18(1), 136-146. <https://doi.org/10.1016/j.jempfin.2010.05.005>
- Markowitz, Harry. "Portfolio Selection." *The Journal of Finance*, vol. 7, no. 1, 1952, pp. 77–91. *JSTOR*, <https://doi.org/10.2307/2975974>. Accessed 23 Feb. 2024.
- Marr, Bernard. "The 5 Biggest Problems with Blockchain Technology Everyone Must Know About." *Forbes*, Forbes Magazine, 4 Oct. 2023, www.forbes.com/sites/bernardmarr/2023/04/14/the-5-biggest-problems-with-blockchain-technology-everyone-must-know-about/?sh=400d036255d2.
- Ruan, Keyun. *Digital Asset Valuation and Cyber Risk Measurement: Principles of Cybernomics*. United Kingdom, Elsevier Science, 2019.
- "State of Crypto Index." A16z Crypto, a16zcrypto.com/stateofcrypto/. Accessed 15 Feb. 2024.
- Stefan Mittnik & Svetlozar T. Rachev (1993) Modeling asset returns with alternative stable distributions *, *Econometric Reviews*, 12:3, 261-330, DOI: 10.1080/07474939308800266

8. Funding Request

The proposed research project will require several different data sources, tools, and services to successfully complete the planned analysis over the next 5 months. Key expenses that have been identified and budgeted include the purchase of various API bundles to access the necessary market, on-chain, and social media data. In addition, attending an industry conference for expert guidance, ongoing database hosting fees, and general development costs will need to be covered. A high-level breakdown of the anticipated expenses by category and vendor is shown in the table below to provide an overview of the key line items and total projected budget of \$5,690 for this phase of the research.

Expense	Source/Vendor	Cost/unit	Quantity	Total Cost
API 1 Santiment	https://api.santiment.net/	\$420/m	5	\$2,100
API 2 IEX Cloud	https://iexcloud.io/pricing	\$500/m	5	\$2,500
API 3 Taapim	Taapi	\$30/m	5	\$150
ETH Denver Attendance	Hotel, Food, Transportation	300	2	\$600
Database Solution Cost	MongoDB (Shared M2)	\$9/m	10	\$90
Misc Dev Cost				\$250
Total Proposed Budget				\$5,690.00