ABTRACT:

*Perhaps lengthen this a bit??*

[*https://guidetogradschoolsurvival.wordpress.com/2011/04/01/how-to-write-abstracts/*](https://guidetogradschoolsurvival.wordpress.com/2011/04/01/how-to-write-abstracts/)

We present a tool that performs trend analysis on momentum of financial predictors and twitter sentiment of 3 cryptocurrencies, (Bitcoin, Litecoin, and Vertcoin) instances to forecast price change. Due to the infancy of the cryptocurrency market, most investors are still novices and need tools to be able to break into and understand the cryptocurrency investor market. By using a system that utilizes both momentum analysis and sentiment analysis we created a toolbox for the cryptocurrency investor. These tools enlighten the current state of the cryptocurrency investor market to enable any investor to make more informed decisions. With this novel approach taken to cryptocurrency we have provided a tool to bring cryptocurrency investing into the mainstream for all investors.

INTRODUCTION:

*Introduction should consist of five paragraphs answering the following five questions:*

1. *What is the problem?*
2. *Why is it interesting and important?*
3. *Why is it hard? (E.g., why do naive approaches fail?)*
4. *Why hasn't it been solved before? (Or, what's wrong with previous proposed solutions? How does mine differ?)*
5. *What are the key components of my approach and results? Also include any specific limitations.*

*From:* [*http://cs.stanford.edu/people/widom/paper-writing.html#intro*](http://cs.stanford.edu/people/widom/paper-writing.html#intro)

*Also note:* [*https://guidetogradschoolsurvival.wordpress.com/2011/04/04/introductions/*](https://guidetogradschoolsurvival.wordpress.com/2011/04/04/introductions/)

The cryptocurrency Bitcoin, based on blockchain technology, is as a secure method to make financial transactions. Within a short span of time, hundreds of cryptocurrencies have been created and more are continually being created. The kind of asset most investors view cryptocurrencies as are not fully understood. The markets are trying to decide whether they are a hedge, safe haven or a form of currency [4]. Because cryptocurrencies are not like fiat currencies, it is difficult to apply the same tools in investing in cryptocurrency as it is to invest in foreign exchange markets. These are the tools which we provide in this paper.

Given that the cryptocurrency market is so young, there is a lot of discussion on how to use this currency for investment purposes. Some research has shown that Bitcoin, the most influential cryptocurrency on the market at this time, is being used as a speculative asset for investors [4]. Traditional markets do not classify cryptocurrency as any type of asset but it needs to be classified if it is to be utilized across the marketplace. In order to give the investor the tools necessary to invest with confidence in the cryptocurrency market we describe the type of asset cryptocurrencies behave.

Cryptocurrency is not like the traditional fiat currency and the same metrics which investors use to trade fiat currencies cannot be used with cryptocurrency. The main reason for this is what makes cryptocurrency a currency. Bitcoin is a peer-to-peer cryptographic digital currency that was created in 2009 by an unknown person using the alias Satoshi Nakamoto. Cryptocurrencies, like Bitcoin, are unregulated and hence come with benefits and issues which do not make them able to be analyzed as a fiat currency would be. With cryptocurrency, transactions can be done in a frictionless manner, no fees, and anonymously. It can be purchased through exchanges or can be mined by solving complex cryptographic puzzles [1].

With the cryptocurrency being in its infancy, there has not been a lot of analysis into what cryptocurrency is and how it should be analyzed. There simply has not been the level of analysis on cryptocurrency that is required to bring it to mainstream assets classes. Currently the cryptocurrency exchanges use market capitalization as an index to see how large the cryptocurrency market is. Market capitalization comes from the definition in traditional markets and is not readily transferable to the cryptocurrency mainly because cryptocurrency is not fully in the market. Since the currencies have to be mined to be created, the market is limited but not yet fully realized. A change in this calculation is needed in order to allow investors to see the full impact that a currency may have in the future [14].

In this paper, our main focus is delivering a set of tools to the investors that utilize metrics that are more suitable to the cryptocurrency market than are currently being used. Using market capitalization as one of our tools, we expand on the current use of this parameter and modify its calculation so that it is more indicative the current and future state of the cryptocurrency market. We utilize factor investing, mainly momentum analysis, along with sentiment analysis amongst social media to compile a model in which the investor can have confidence in when making investment decisions.

RELATED WORK:

*Note:* [*https://guidetogradschoolsurvival.wordpress.com/2011/04/08/how-to-write-related-work/*](https://guidetogradschoolsurvival.wordpress.com/2011/04/08/how-to-write-related-work/)

*Rearrange these notes? Meld with the background work?*

Just recently have mainstream financial institutions like Fidelity [3] begun to give their customers the ability to add cryptocurrencies to their financial portfolios. Besides continual development of the cryptocurrency products, additional marketplace tools are needed to support this growing marketplace. Cryptocurrency is so new that even large, stable banks are having a difficult time quantifying the movements and predicting where cryptocurrency is headed next.

In order to better model cryptocurrency, we need to understand how and why it behaves such as it does. One of the main issues with cryptocurrency is that each currency is built somewhat differently. Unlike fiat currency where the units are backed by the government and it has value because the government says it has value, cryptocurrency has value because others who have bitcoin say it has value. In some research, Bitcoin has been found to be negatively correlated with the Yuan and the USD while being positively correlated with the USD/EUR exchange rate [4]. Liquidity is one of the major issues with cryptocurrencies. Unlike fiat currency where a large transaction is easily absorbed into the system with little affect to the exchange price for cryptocurrencies a large transaction incurs heavy fees and cause a large fluctuation in the exchange price of the currency [5].

In one fiat currency models we looked at, a set of financially motivated kernels were constructed for the EURUSD foreign exchange market and were used to predict the direction of price movement for the exchange rate over multiple time horizons. Multiple kernel learning, or MKL, is shown to outperform each of the kernels individually in terms of predictive accuracy [12].

In order to determine whether cryptocurrencies such as Bitcoin can be considered an asset class similar to the world’s government backed currencies a cryptocurrency would need to satisfy three questions. These questions are: can it be used as a medium of exchange? Can it be used as a unit of comparability between two goods and also, it must store value over time [4]. Cryptocurrencies are being used to exchange goods and goods can be related to what their value is in a cryptocurrency. Finally, in the short-term Bitcoin acts as a safe-haven investment and in the long run acts as a hedge [4].

What causes the price fluctuations in Bitcoin and other cryptocurrencies are dependent on both internal and external factors [4]. The internal factors are supply and demand but since the supply is deterministic this means that the only internal driver is the demand for Bitcoin. One of the metrics for the demand for Bitcoin is the hash rate or how quickly the cryptocurrency is being mined. External factors affecting the price of Bitcoin are the adoption rate and how it is being used as an investment vehicle.

Also, in determining our momentum analysis model we looked through previous factor investing models where an investor invests funds in the underlying risk factors that make up an asset class. The momentum of an asset is looking at the past performance of an asset and using that to determine the future of that asset. The momentum strategy of Jegadeesh and Titman (1993) was able to produce abnormal positive returns [10].

[1] Bayesian regression and Bitcoin

[4] Exploring the Determinants of Bitcoin’s price, an application of Bayesian Structural Time Series

[2] Coin Market Cap website

[3] Stern, H: Fidelity Labs Tests Digital Asset Wallet On Fidelity.com. August, 09, 2017. <https://www.fidelity.com/about-fidelity/corporate/fidelity-labs-tests-digital-asset-wallet-on-fidelity.com>

[5] <https://www.coindesk.com/solving-liquidity-challenge-decentralized-exchanges/>

[6] Predicting the price of Bitcoin using Machine Learning

[7] Algorithmic Trading of Cryptocurrency

[8] Application of Neural Network for Forecasting of Exchange Rates and ForEx Trading

[9] Automated Bitcoin Trading via Machine Learning Algorithms

[10] Facts and Fantasies About Factor Investing

[11] Bitcoin Market Volatility Analysis Using Grand Canonical Minority Game \_ Ortisi \_ Ledger

[12] Currency Forecasting using Multiple Kernel Learning with Financially Motivated Features 2010

[13] Does Governance Have a Role in Pricing\_ Cross-Country Evidence From Bitcoin Markets

[14] <https://www.bletchleyindexes.com/blog/idx_perf_post>