[Elements of Economics, Finance, and Computational Mathematics]

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Abstract

We examine an emerging pedagogical realm in which the importance of three major disciplines are considered in synchronicity. The aim is to understand the coherence of an interdisciplinary science formed around modern Economics, Finance, and Computational Mathematics. We recognize the rapidly evolving progress in data encoding techniques and contemplate economic, financial, and societal phenomena that may arise from technology evolving at increasing rates.

Contents

1 Introduction

We will preface this paper with a few notions believed to be true, honest, and scientifically informed to the best of our abilities.

The first fundamental axiom we consider is that recent evolutions in cryptography [9] [19] [24] [1] create new possibilities in many financial, legal, and economic processes allowing for the properties of full transparency and trust-less execution. We make an inherent connection between economic and social prosperity. We also borrow the illustrious concept of *efficient market hypothesis* as famously described by Fama and Samuelson [8] to justify the veracity of market convergence to optimal results given sufficient coverage and volume. We recognize contemporary technology as a potentially pernicious solution to economic processes and their corruption by malicious intent. Semantic junctures between various meanings of the word *corrupt* lend themselves perfectly to our study for one principal reason: we claim that a mathematically incorruptible informational process is the ideal tool for transitioning vital financial processes to a transparent framework designed to protect against malicious human intent (i.e., *corruption*).

2 Recent computational developments

2.1 Zero Knowledge Proofs

Zero Knowledge proofs [9] are a familiar cryptographic concept with recent applicability to scaling financial circuitries [20].

2.2 Machine learning in numerical methods

Machine learning methods allow for greater accuracy in all manner of numerical computation and model interpretation tasks. Interpretability of models allows for easier and more accurate volatility modelling [2] [17] [26] [36] [4].

3 Internet of things

3.1 Kleros [38]

Kleros [38] aims to automate certain commercial mediation processes by use of blockchain technology allowing for financial arbitrage in conflict resolution scenarios.

3.2 Tornado Cash [24] [27]

Tornado Cash is a peculiar blockchain smart contract protocol that allows users to send and receive cryptocurrency payments completely anonymously. The protocol has purportedly been flagged by US authorities leading to very little utilization.

3.3 Cofence [7]

Cofence present a cybersecurity email protection algorithm with integrated human vetting.

3.4 Polymarket [29]

Polymarkets are an interesting phenomenon that, with sufficient volume, may have significant economic effects on an observed event.

3.5 Quantgov [30]

Quantgov seemingly publicises various regulatory documents potentially in the idea to cut red tape.

3.6 TinyURL [33]

TinyURL advertises a useful link shortening tool with added security features along a paid subscription. Modern cryptographic links are long and may seem intimidating especially when domain names change rapidly.

3.7 MyBib [23]

MyBib is a powerful tool for understanding how BibTeX files work, bringing new dimensions to independent research.

3.8 ORCiD [25]

ORCiD provides an easy way for researchers to connect and share work with cutting edge technology at their fingertips.

4 Hypotheticals

4.1 Macroeconomic trend prediction using live shipping data

4.2 Decentralization for internal and external policy

4.3 Commodities markets and their decentralization

4.4 FX option markets and their decentralization

4.5 Commerical legal services and their decentralization

4.6 Engineering solar panels into protected forestry domain

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