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Grant: AFAANZ 2021 Research Fund

Applicants: Associate Professor Adrian Gepp (adgepp@bond.edu.au) and Associate Professor Christopher Bilson (cbilson@bond.edu.au), Bond Business School, Bond University

Project Title: Canary in the Cryptocurrency: Identifying abnormalities likely associated with fraud

Funding: \$6,431

Expenditure: \$6,431 on research assistant work, as stated in the application. Financial Acquittal is included separately.

Project Summary *(original in italics)*

This study uses a novel fraud detection measure and applies it to a large sample of cryptocurrencies over the 2017-2021 period. This measure is calculated from the moment conditions of cryptocurrency returns and allows us to detect anomalous return behaviour and more importantly to identify the currency characteristics and conditions when this behaviour occurs. Our study, therefore, has substantial potential benefits to both regulators and investors, not least in terms of market integrity and investor confidence, both of which presently stand as impediments to cryptocurrency being accepted as an asset class.

Using linear and classic moment definitions of cryptocurrency returns we initially investigate the autoregressive behaviour of moment-tilt portfolios formed using the methodology of Fama and French. These single and multiple-sort moment-tilt portfolios are then compared with the aggregate moment ('GUN') measure of Bernard et al. (2019). Our initial analysis documents predictability in these moment-tilt portfolios suggesting that trading conditions where fraudulent activities could be obscured could possibly be predicted. Interestingly, the aggregate measure displays a similar predictive capacity for future periods of anomalous market behaviour. Our final analysis tests these lagged associations within a formal trading strategy. Consistent with the previous results, we find evidence of the success of these strategies, conditional across a range of moment combinations. These findings are clearly of interest to both regulators and investors, and we believe our research to be the first to document these. This research has also identified a number of fruitful avenues for expanding the analysis beyond the current grant.

Outcome

We are currently drafting a manuscript with a target journal of the Australian Journal of Management (ABDC: rank A). This manuscript will novel findings about the behaviours of the major cryptocurrencies and the application of cross-disciplinary fraud detection with moment-tilt portfolios. It will then conclude with a discussion of the practical implications of these findings and recommendations.

Future Intentions for this Project

The next phase of this research, as enabled by this seed funding and initial project analysis, is intended to focus on applying well-known and widely utilised machine learning techniques to better unpack interactions between return series moments and capture likely non-linear investor utility function parameter interactions. Much of the investment and asset management literature makes an assumption about a representative investor utility function, which then allows moments of the return series to enter the function and be used coalescently. However, there does not appear to be a common understanding as to what parameters to use for specific commonly used utility functions, not to mention what function or function class to use. Our proposed future work aims to initially relax the assumption of specific moment interactions that define ultimate investor utility and focus on rebuilding these interactions backwards from the available data.

Summary of Outcomes and Benefits

It is the first research to integrate findings from applying a novel fraudulent behaviour measure and traditional moment-based portfolios to detect anomalous cryptocurrency returns behaviour. There is substantial benefit stemming from this research to both practitioners and researchers. Financial crime investigators, together with a wider investment and financial system community, could benefit from such a deeper understanding of the behaviour of this relatively novel asset class of cryptocurrencies. Financial crime and cryptocurrency researchers will benefit from our findings shedding further light on the nature of cryptocurrencies as an asset class, likely common usage intentions and insights from our moment-tilt portfolio approach. Lastly, this research lays a foundation for relaxing dogmatic investor utility function assumptions commonly made in the literature to utilise universal function approximation capabilities of machine learning techniques and better represent return characteristics interactions for investors.