**Crypto portfolio**

**Hence, in this paper we examine questions associated with previous research:**

1) 加密货币投资组合能否盈利

Are cryptocurrency portfolios profitable compared to traditional financial asset classes? We evaluate the performance of portfolios of cryptocurrencies factors relative to conventional financial asset classes such as stocks, bonds, treasury bills, and a cryptocurrency index.

2) 有无指标分析表现 （高度非正态分布）

Is there a proper metric to compare the performances of different underlying assets? Because the empirical distributions of cryptocurrency returns are highly non-normal, this has limited the number of researchers who have examined the risk factors and analysed cryptocurrencies' performances. → 使用ASD

3) 若能超额收益，长短腿哪一个有助于

If outperformance of cryptocurrency exists, do long leg or short leg of cryptocurrency factor portfolios contribute to outperformance? →长腿（long-short strategies）

4) 超额收益是否源于风险溢价或错误定价

Does any outperformance of cryptocurrency factor portfolios come from risk premium or mispricing? → 错误定价，因为α significant但R2很小

5) 是否能用错误定价引子+基本引子+三因素模型来解释outperforming

Can outperforming cryptocurrency factor portfolios be accurately explained by adding mispriced factors and cryptocurrency fundamental factors to a coin market three-factor model? → 加入四个错误定价引子+electricity and computing power，α significant但R2很小，仍然为错误定价

**To fill this gap,**

we examine the performance of cryptocurrency portfolios based on different risk factors by conducting almost stochastic dominance (ASD) proposed by Leshno and Levy (2002) on the 400 largest cryptocurrencies, which account for over 80% of total market capitalization.

对占总市值 80% 以上的 400 种最大的加密货币进行了**近似随机优势（ASD）**分析，从而考察了基于不同风险因素的加密货币投资组合的表现

因为 1）传统均值方差法不适用 2）消除投资者极端偏好的影响

→ ASD is a non-parametric method

which **compares two uncertain prospects** by maximizing expected utility, and **does not require any assumption** about the return distribution.

Inspired by Fama and French (1993), Carhart (1997), Liu et al. (2019) and Feng et al. (2020), we divide the available factors information into four categories: size, momentum, volume and volatility. We sub-divide the four large categories into 27 factor portfolios (see Table 3) to study whether cryptocurrencies share similarities with stocks regarding anomalies and examine each factor's relative performance against selected benchmarks.

通过多个模型启发，将四大类衡量加密货币的因素规模、动量、交易量和波动率细分为27个因子组合，研究在anomalies是否与股票相似

Summary of the literature 2.1-2.2：

2.1

Financial economists have identified key risk factors, such as the size (SMB), book-to-market (HML), and momentum (MOM) factors, which explain the cross-sectional variation in stock and bond returns (Fama & French, 1993; Carhart, 1997). These models have been extended to predict equity premiums using technical indicators and combined forecasts. However, research on cryptocurrencies is limited due to small sample sizes and undetected anomalies. This paper aims to address this gap by developing factors to capture cross-sectional variation in cryptocurrency returns, analyzing 27 factor portfolios, and using mispricing models for robustness.

2.4

The current literature on cryptocurrency is still developing, with Liu et al. (2019) and Liu et al. (2020) being notable contributors. Liu et al. (2019) created a three-factor model for cryptocurrencies similar to equity pricing models, while Liu et al. (2020) explored potential risk exposures for major cryptocurrencies, finding little correlation with traditional asset factors. Our research differs by focusing on the performance of cryptocurrency factor portfolios rather than asset pricing. Using a non-parametric approach, we evaluate the long-short portfolio performance and examine whether dominance arises from mispricing or a risk premium.