Gresham Quant

Take-home data exploration task

We would like you to have the opportunity to show us some of your research skills by completing an exploratory data analysis task. Attached is a csv file containing the prices and volumes (px_last & px_volume from Bloomberg) for several crypto-currencies and related financial instruments.

The data is arranged in pairwise format, each pair having the 'Last Price' and 'Volume' fields for the following:

BTC1	Generic 1st `BTC' Future (Bitcoin futures)
DCR1	Generic 1st `DCR' Future (Etherium futures)
BGCI	BGCI Galaxy Crypto Index
XBT	Bitcoin (prices for this and the other Crypto coins are USD)
XET	Etherium
XBI	Binance Coin
XRP	XRP
XAD	Cardano
XSO	Solana
XDG	Dogecoin
SPXT	S&P 500 total return prices
XNDX	Nasdaq total return prices
GC1	Generic 1st `GC' Future (1 troy oz. Gold, priced in USD)

The task: we would like you to write some research code to explore this data. Feel free to use whichever tools or libraries you are most familiar with, or which you feel will help you to learn the most about this dataset. For example we would probably use Python/Pandas/Numpy/Scipy, but this is only a suggestion, feel free to use whichever libraries or tools you like.

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Some possible **questions/investigations**:

1. **How are the crypto-currency prices or returns inter-related? [Hint: Here you could think about correlation for example, or other measures of dependence or relationship. Can you put confidence limits around these?]**

2. **Can one crypto coin be used to predict another?**

3. **Do the crypto coins share some of the distributional properties as the other returns? Which is likely to be a 'better' investment? [Hint: think about what better means in the context of distributions of returns & illustrate this]**

4. **What is the relationship of crypto returns with financial asset returns? Has it changed over time? [Hint: like 1]**

5. **If you were creating a simple trading strategy for one of these coins – could you sketch out how you would do it? [For example: a very simple trading strategy is 'mean reversion', the idea that if an asset is in the extreme of its range of movements it is likely to head back towards the mean value. No need for this to actually make money!]**

6. **If you already had some trading strategies for a variety of these coins how would you combine them together to create a single 'optimal' strategy?**

7. **How is the Bloomberg Galaxy Crypto Index related to the individual crypto coins?**

Notes: *Please answer either **two** or **three** of these questions. We would like to review your code and potentially discuss your results. Don't feel you have to spend too long on this – as a rough guide an hour and half per question should be enough time to produce something reasonable. Don't spend more than a day on the whole task.*