BitcoinInvestment

January 31, 2022

1 Bitcoin Investment

1.1 Background

An investment fund in New York is exloring whether it is a good idea to invest some of the fund's assets in Bitcoin. You have to prepare a report on this asset and how it compares to the stock market in general.

1.2 The data

You have access to three files:

Bitcoin daily data in US dollars

- "date" - date from September 17, 2014 to November 17, 2021
- "open" - the price at the beginning of the trading day
- "high" - the highest price reached that day
- "low" - the lowest price reached that day
- "close" - the price at the closing of the trading day
- "volume" - how many Bitcoin were traded that day

S&P 500 daily data

- "date" - date from September 17, 2014 to November 17, 2021
- "open" - the index level at the beginning of the trading day
- "high" - the highest level reached that day
- "low" - the lowest level reached that day
- "close" - the level at the closing of the trading day
- "volume" - how many shares in the companies that make up the index were traded that day

inflation and gold as monthly data

- "date" - date from September, 2014 to November, 2021
- "gold_usd" - price in usd of gold for that month
- "cpi_us" - the inflation index for the US for that month (cpi = consumer price index)

CPI data from the U.S. Bureau of Labor Statistics. Publicly available information.

1.3 Competition challenge

Create a report that covers the following:

1. How does the performance of Bitcoin compare to the S&P 500 and the price of gold?
2. Analyze Bitcoin's returns and volatility profile. Do you believe it could help improve the performance of a portfolio? Do you believe Bitcoin could be used as a hedge versus inflation?
3. The CFO is looking to lower volatility in the fund. Explore building a portfolio using some or all of these assets. Make a recommendation that minimizes overall risk.

[2]:
```
import pandas as pd

#BITCOIN DATA MANIPULATION:
btcDF = pd.read_csv('./data/bitcoin-usd.csv', parse_dates=['date']).
 ↪filter(['date', 'close']).rename(columns={'close':'Bitcoin'}, inplace=False)
btcDF['date'] = btcDF['date'].astype(str) #must change date to str see above␣
 ↪reference
btcDF['day'] = btcDF['date'].str[-2:] #last two digits are the day
btcDF=btcDF.loc[btcDF['day'].str.contains('01')].reset_index(drop=True)
btcDF['date'] = btcDF['date'].apply(pd.to_datetime) #change date back to date␣
 ↪type before a JOIN merge
```

[9]:
```
#SP500 DATA MANIPULATION:
spyDF = pd.read_csv('./data/sp500.csv', parse_dates=['date']).filter(['date',␣
 ↪'close']).rename(columns={'close': 'SP500'}, inplace=False)
spyDF['date'] = spyDF['date'].astype(str) #must change date to str see above␣
 ↪reference
spyDF['day'] = spyDF['date'].str[-2:] #last two digits are the day
spyDF=spyDF.loc[spyDF['day'].str.contains('01')].reset_index(drop=True)
spyDF['date'] = spyDF['date'].apply(pd.to_datetime) #change date back to date␣
 ↪type before a JOIN merge
```

```
<class 'pandas.core.frame.DataFrame'>
```

[2]:
```
# CPI/GOLD DATA:
monthlyDF = pd.read_csv('./data/monthly_data.csv', parse_dates=['date'])
head=monthlyDF.head()  #date  gold_usd   cpi_us

#MERGE THE THREE DATAFRAMES:
joinDF = pd.merge(btcDF, monthlyDF, on='date', how='outer').
 ↪reset_index(drop=True)
finalDF = pd.merge(joinDF, spyDF, on='date', how='outer').reset_index(drop=True)
finalDF = finalDF.dropna()
finalDF= finalDF.drop(['day_x', 'day_y'], axis=1, inplace=False).
 ↪reset_index(drop=True)
head=finalDF.head() # date  btc  gold_usd   cpi_us SP500

#PLOT DATA:
import matplotlib.pyplot as plt
finalDF.plot(x='date', y=['Bitcoin', 'gold_usd', 'SP500', 'cpi_us'],␣
 ↪title="Bitcoin Analysis", xticks=90)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_149/666032932.py in <module>
      1 # CPI/GOLD DATA:
----> 2 monthlyDF = pd.read_csv('./data/monthly_data.csv', parse_dates=['date']
      3 head=monthlyDF.head()  #date  gold_usd   cpi_us
      4
      5 #MERGE THE THREE DATAFRAMES:

NameError: name 'pd' is not defined
```

2 Summary

Bitcoin does well in inflation which seems to be the case. However, too much inflation can easily "backfire". When there is too much inflation, the Federal Reserve (FED) will be forced to raise interest rates. This will cause risky assets to decline. Bitcoin has many unknown predictors. Risky assets in general have done well during COVID19 due to low interest rates and quantitative easing. Since 2014, Bitcoin has increased in value by over 10,000%. Therefore, the graph is difficult to analyze because of the massive jump during the bull run starting around 2020. Some hedge fund analyst believe that bitcoin will continue to be the best performing asset class. Ray Dalio, the biggest hedge fund manager, believes bitcoin is at risk due to U.S. regulation. In conclusion, Bitcoin is a way to diversify assets, like gold. In addition, it is a high-risk return asset that can perform very well with a long-time horizon.S

2.1 Judging criteria

CATEGORY	WEIGHTING	DETAILS

| **Recommendations** | 35% |

Clarity of recommendations - how clear and well presented the recommendation is.

Quality of recommendations - are appropriate analytical techniques used & are the conclusions valid?

Number of relevant insights found for the target audience.

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| **Storytelling** | 30% |

How well the data and insights are connected to the recommendation.

How the narrative and whole report connects together.

Balancing making the report in depth enough but also concise.

| | **Visualizations** | 25% |

Appropriateness of visualization used.

Clarity of insight from visualization.

| | **Votes** | 10% |

Up voting - most upvoted entries get the most points.

|

2.2 Checklist before publishing into the competition

- Rename your workspace to make it descriptive of your work. N.B. you should leave the notebook name as notebook.ipynb.
- Remove redundant cells like the judging criteria so the workbook is focused on your story.
- Make sure the workbook reads well and explains how you found your insights.
- Check that all the cells run without error.