Return and Risk analysis for Client 148, Paul Bistre

Course: Data Extraction & Visualization - DAT-6081 - BMBAN1

Assignment A1: Extracting using SQL and Loading into Data Viz

Due Date: December 15, 2024

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Creation of View:

```sql
CREATE VIEW AbiJoshuaGeorge AS
SELECT
    pricing.date AS price_date,
    security.major_asset_class AS major_assets,
    security.minor_asset_class AS minor_assets,
    pricing.ticker AS ticker,
    security.sec_type AS asset_type,
    holdings.quantity AS quantity,
    pricing.value AS price_value,
    holdings.quantity * pricing.value AS holding_value
FROM
    invest.account_dim AS accounts
INNER JOIN
    invest.holdings_current AS holdings
    ON accounts.account_id = holdings.account_id
INNER JOIN
    invest.pricing_daily_new AS pricing
    ON holdings.ticker = pricing.ticker
INNER JOIN
    invest.security_masterlist AS security
    ON holdings.ticker = security.ticker
WHERE
    accounts.client_id = 148
    AND pricing.price_type = 'adjusted'
    AND pricing.date >= '2020-08-01';
```

SQL Queries:

1. Most recent 12 months, 18 months, 24 months return for each of the securities (and for the entire portfolio):

SQL Code 1:

```
-- Question 1
SELECT
    ticker,
    -- Calculate 12-month return
    (MAX(CASE WHEN price_date = '2022-09-09' THEN price_value END) -
     MAX(CASE WHEN price_date = '2021-09-09' THEN price_value END)) /
     MAX(CASE WHEN price_date = '2021-09-09' THEN price_value END) * 100 AS return_12M,
    -- Calculate 18-month return
    (MAX(CASE WHEN price_date = '2022-09-09' THEN price_value END) -
     MAX(CASE WHEN price_date = '2021-03-09' THEN price_value END)) /
     MAX(CASE WHEN price_date = '2021-03-09' THEN price_value END) * 100 AS return_18M,
    -- Calculate 24-month return
    (MAX(CASE WHEN price_date = '2022-09-09' THEN price_value END) -
     MAX(CASE WHEN price_date = '2020-09-09' THEN price_value END)) /
     MAX(CASE WHEN price_date = '2020-09-09' THEN price_value END) * 100 AS return_24M
FROM
    AbiJoshuaGeorge
WHERE
    price_date IN ('2020-09-09', '2021-03-09', '2021-09-09', '2022-09-09')
GROUP BY
    ticker;
```

SQL Result 1:

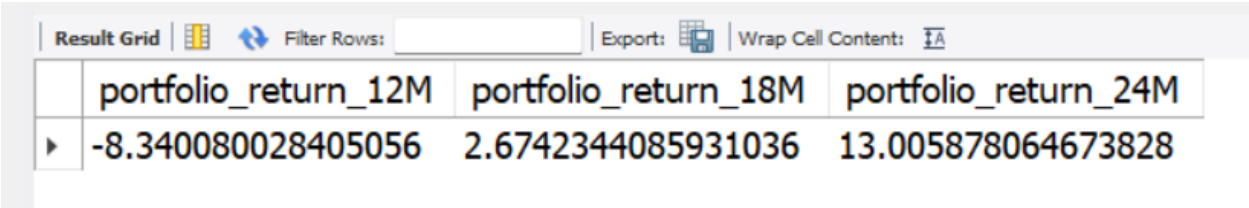
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

ticker	return_12M	return_18M	return_24M
SLV	-22.227211495285136	-27.9833649889133	-31.215250198570292
VMBS	-10.886659692744342	-10.59768434454596	-11.268806867381791
IGSB	-6.441673020712423	-5.26704855668079	-4.959111547500057
SCHP	-7.821394976951812	-1.6298572971031027	-1.640000536639518
CNC	48.46675191198759	49.601553111024465	60.40104831389881
VCIT	-14.4944307046538	-11.205947721827064	-12.810654987521353
PANW	21.06538478027868	64.93487487835591	136.90018213674958
COF	-29.164777258733643	-11.757904095114293	58.6679114011976
SBAC	-7.275290761999531	34.97606312046828	7.232725171142983

SQL Code 2:

```
45 •    SELECT
46          -- Portfolio return for 12 months
47          (SUM(CASE WHEN price_date = '2022-09-09' THEN holding_value ELSE 0 END) -
48           SUM(CASE WHEN price_date = '2021-09-09' THEN holding_value ELSE 0 END)) /
49           SUM(CASE WHEN price_date = '2021-09-09' THEN holding_value ELSE 0 END) * 100
50           AS portfolio_return_12M,
51
52          -- Portfolio return for 18 months
53          (SUM(CASE WHEN price_date = '2022-09-09' THEN holding_value ELSE 0 END) -
54           SUM(CASE WHEN price_date = '2021-03-09' THEN holding_value ELSE 0 END)) /
55           SUM(CASE WHEN price_date = '2021-03-09' THEN holding_value ELSE 0 END) * 100
56           AS portfolio_return_18M,
57
58          -- Portfolio return for 24 months
59          (SUM(CASE WHEN price_date = '2022-09-09' THEN holding_value ELSE 0 END) -
60           SUM(CASE WHEN price_date = '2020-09-09' THEN holding_value ELSE 0 END)) /
61           SUM(CASE WHEN price_date = '2020-09-09' THEN holding_value ELSE 0 END) * 100
62           AS portfolio_return_24M
63      FROM
64          AbiJoshuaGeorge
65      WHERE
66          price_date IN ('2020-09-09', '2021-03-09', '2021-09-09', '2022-09-09');
```

SQL Result 2:



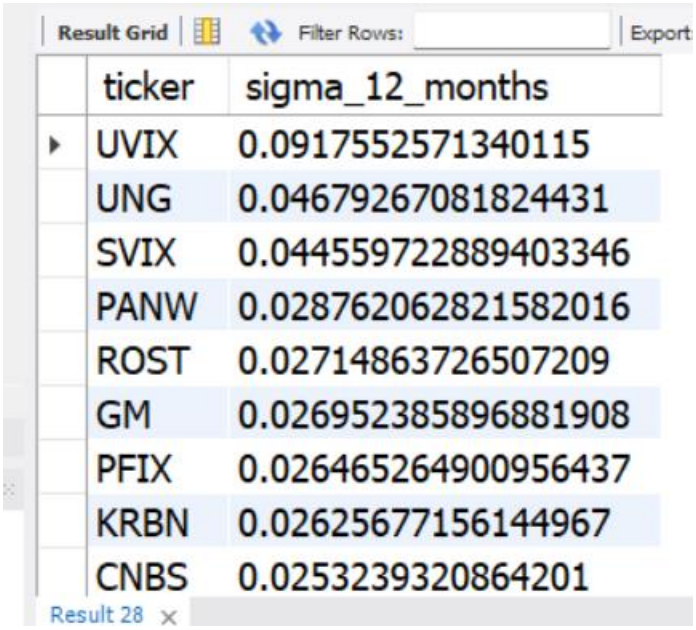
portfolio_return_12M	portfolio_return_18M	portfolio_return_24M
-8.340080028405056	2.6742344085931036	13.005878064673828

2. Most recent 12 months sigma (risk) for each of the securities and their average daily return:

SQL Code 1:

```
68      -- Question 2
69      -- Risk
70  •   SELECT
71          ticker,
72          STDDEV(daily_return) AS sigma_12_months
73      FROM (
74          SELECT
75              ticker,
76              price_date,
77              (price_value - LAG(price_value) OVER (PARTITION BY ticker ORDER BY price_date)) /
78              LAG(price_value) OVER (PARTITION BY ticker ORDER BY price_date) AS daily_return
79          FROM AbiJoshuaGeorge
80          WHERE
81              price_date BETWEEN '2021-09-09' AND '2022-09-09'
82      ) AS DailyReturns
83      WHERE daily_return IS NOT NULL
84      GROUP BY ticker
85      ORDER BY sigma_12_months DESC;
```

SQL Result 1:

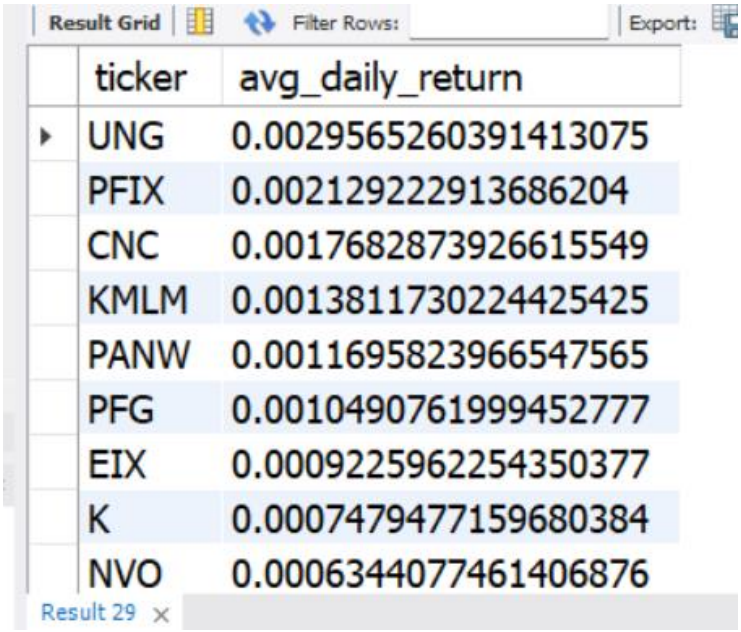


ticker	sigma_12_months
UVIX	0.0917552571340115
UNG	0.04679267081824431
SVIX	0.044559722889403346
PANW	0.028762062821582016
ROST	0.02714863726507209
GM	0.026952385896881908
PFIX	0.026465264900956437
KRBN	0.02625677156144967
CNBS	0.0253239320864201

SQL Code 2:

```
87      -- Return
88      SELECT
89          ticker,
90          AVG(daily_return) AS avg_daily_return
91      FROM (
92          SELECT
93              ticker,
94              price_date,
95              (price_value - LAG(price_value) OVER (PARTITION BY ticker ORDER BY price_date)) /
96              LAG(price_value) OVER (PARTITION BY ticker ORDER BY price_date) AS daily_return
97          FROM AbiJoshuaGeorge
98          WHERE
99              price_date BETWEEN '2021-09-09' AND '2022-09-09'
100     ) AS DailyReturns
101     WHERE daily_return IS NOT NULL -- Exclude null daily returns
102     GROUP BY ticker
103     ORDER BY avg_daily_return DESC;
```

SQL Result 2:



ticker	avg_daily_return
UNG	0.0029565260391413075
PFIX	0.002129222913686204
CNC	0.0017682873926615549
KMLM	0.0013811730224425425
PANW	0.0011695823966547565
PFG	0.0010490761999452777
EIX	0.0009225962254350377
K	0.0007479477159680384
NVO	0.0006344077461406876

3. New investment to existing portfolio and involved risk (sigma):

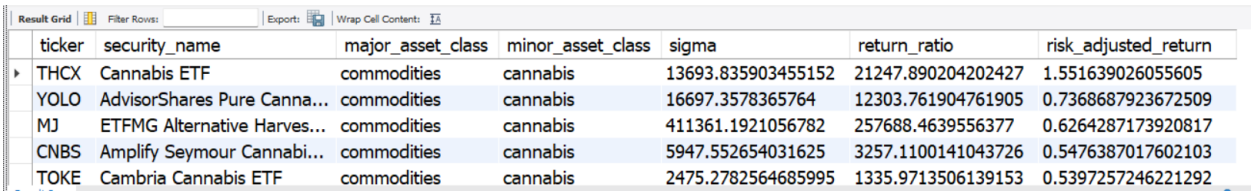
SQL Code:

```sql
-- Question 3
WITH risk_and_return AS (
    SELECT
        p.ticker,
        STDDEV(p.value) AS sigma,
        (MAX(p.value) - MIN(p.value)) / MIN(p.value) AS return_ratio
    FROM
        pricing_daily_new p
    WHERE
        p.date >= '2022-09-01'
    GROUP BY
        p.ticker
),

existing_securities AS (
    SELECT DISTINCT
        sm.ticker,
        sm.security_name,
        sm.major_asset_class,
        sm.minor_asset_class
    FROM
        security_masterlist sm
    LEFT JOIN
        holdings_current hc
    ON
        sm.ticker = hc.ticker
    LEFT JOIN
        account_dim ad
    ON
        hc.account_id = ad.account_id
    WHERE
        (ad.client_id IS NULL OR ad.client_id != 148) -- Excluding securities already held by the client
)

  SELECT DISTINCT
      e.ticker,
      e.security_name,
      e.major_asset_class,
      e.minor_asset_class,
      r.sigma,
      r.return_ratio,
      (r.return_ratio / r.sigma) AS risk_adjusted_return
  FROM
      existing_securities e
  INNER JOIN
      risk_and_return r
  ON
      e.ticker = r.ticker
  WHERE
      r.sigma > 0  -- Excluding securities with zero or undefined risk
  ORDER BY
      risk_adjusted_return DESC;  -- Ranking securities by their risk-adjusted returns
```

SQL Result:



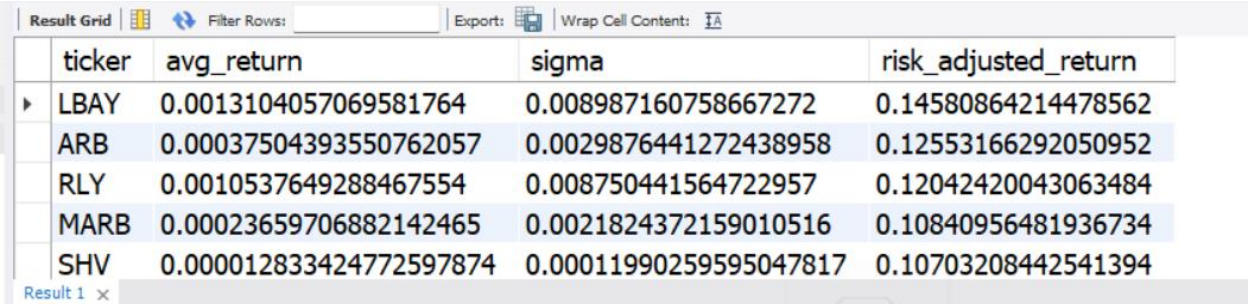
ticker	security_name	major_asset_class	minor_asset_class	sigma	return_ratio	risk_adjusted_return
THCX	Cannabis ETF	commodities	cannabis	13693.835903455152	21247.890204202427	1.551639026055605
YOLO	AdvisorShares Pure Canna...	commodities	cannabis	16697.3578365764	12303.761904761905	0.7368687923672509
MJ	ETFMG Alternative Harves...	commodities	cannabis	411361.1921056782	257688.4639556377	0.6264287173920817
CNBS	Amplify Seymour Cannabi...	commodities	cannabis	5947.552654031625	3257.1100141043726	0.5476387017602103
TOKE	Cambria Cannabis ETF	commodities	cannabis	2475.2782564685995	1335.9713506139153	0.5397257246221292

4. Risk adjusted returns for each of the securities:

SQL Code:

```
158     -- Question 4
159 •   SELECT
160         A.ticker,
161         AVG((A.price_value - B.price_value) / B.price_value) AS avg_return, -- Average return
162         STDDEV((A.price_value - B.price_value) / B.price_value) AS sigma,   -- Risk (standard deviation)
163         AVG((A.price_value - B.price_value) / B.price_value) /
164         STDDEV((A.price_value - B.price_value) / B.price_value) AS risk_adjusted_return -- Risk-adjusted return
165     FROM AbiJoshuaGeorge AS A
166     JOIN AbiJoshuaGeorge AS B
167         ON A.ticker = B.ticker
168         AND A.price_date = DATE_ADD(B.price_date, INTERVAL 1 DAY) -- Offset by 1 day
169     GROUP BY A.ticker
170     ORDER BY risk_adjusted_return DESC;
```

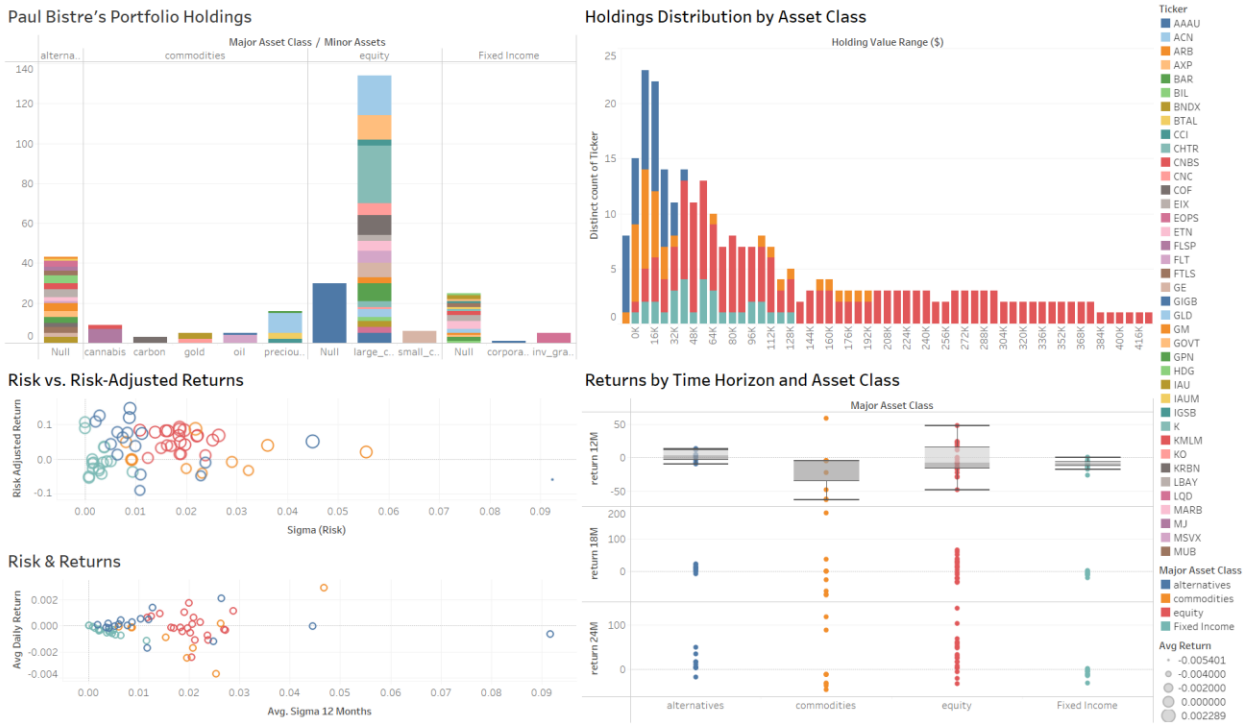
SQL Result:

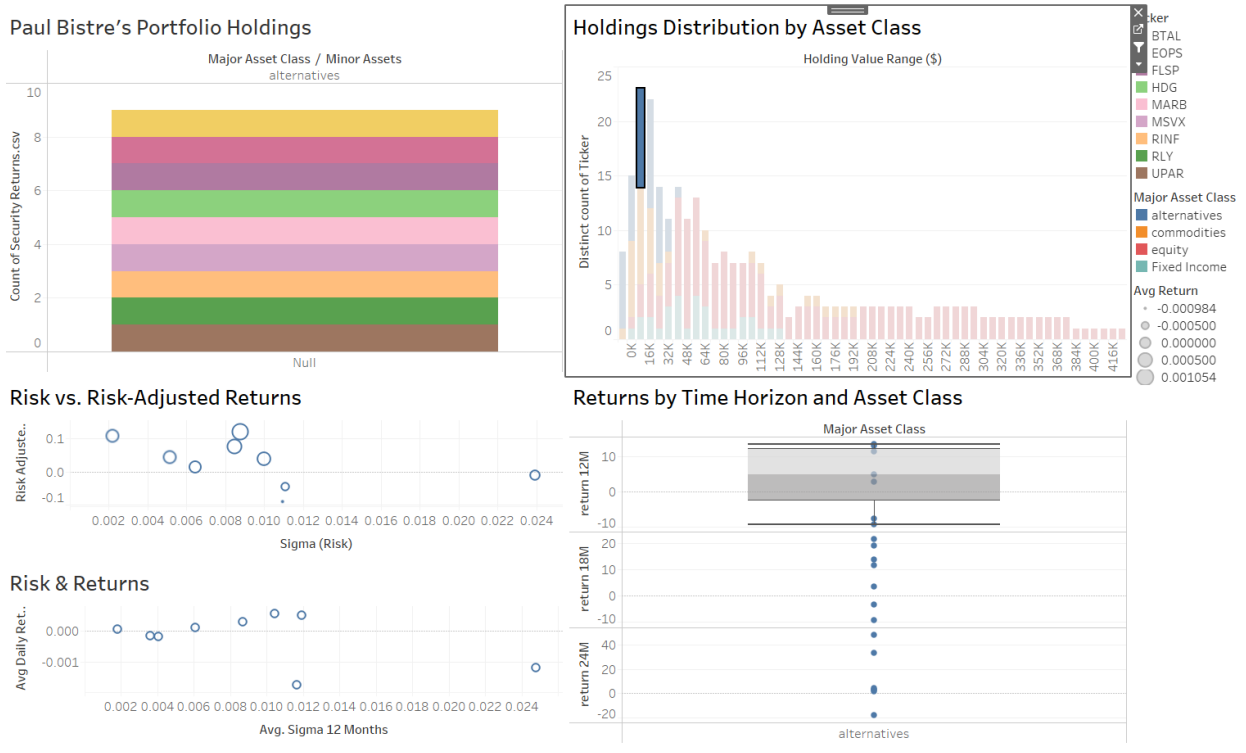


ticker	avg_return	sigma	risk_adjusted_return
LBAY	0.0013104057069581764	0.008987160758667272	0.14580864214478562
ARB	0.0003750439355076205 7	0.0029876441272438958	0.12553166292050952
RLY	0.0010537649288467554	0.008750441564722957	0.12042420043063484
MARB	0.0002365970688214246 5	0.0021824372159010516	0.10840956481936734
SHV	0.0000128334247725978 74	0.0001199025959595047817	0.10703208442541394

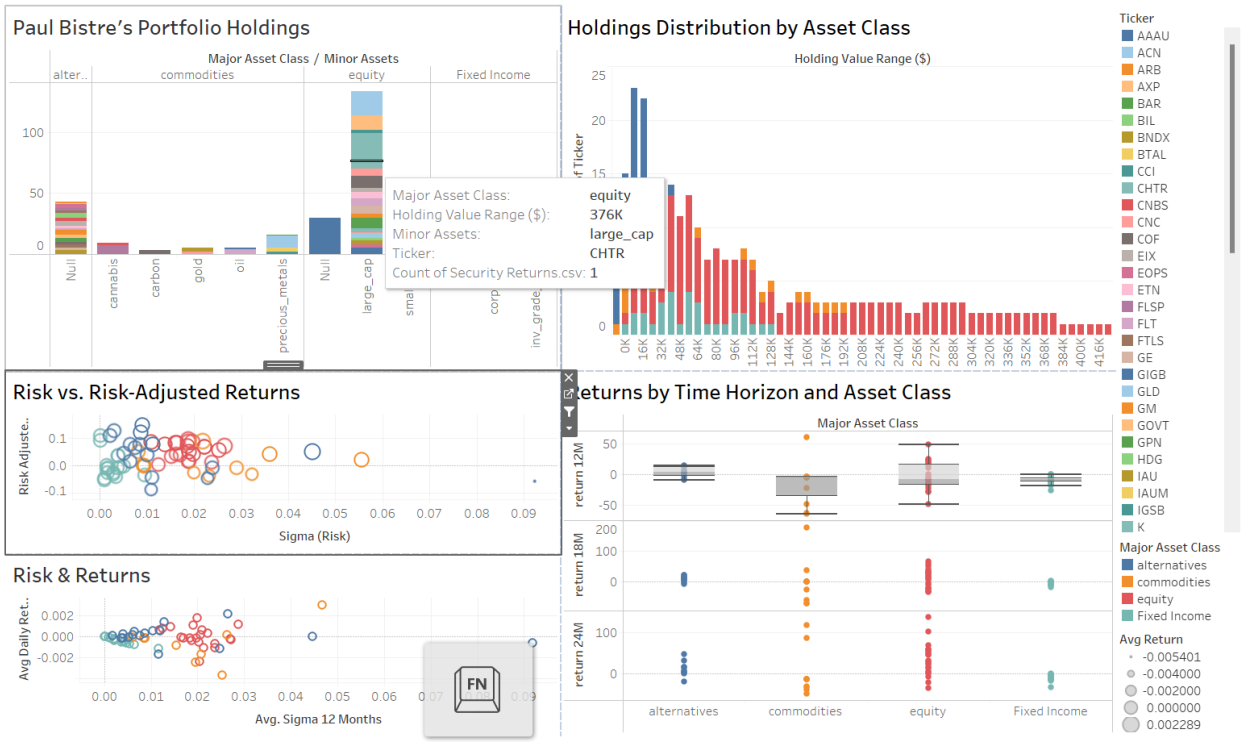
Result 1

Dashboard:


Paul Bistre's Portfolio Holdings
Major Asset Class / Minor Assets
alterna..
commodities
equity
Fixed Income
Null
cannabis
carbon
gold
oil
preciou..
Null
large_c..
small_c..
Null
corpora..
inv_gra..
Holdings Distribution by Asset Class
Holding Value Range ($)
Distinct count of Ticker
Ticker
AAAU
ACN
ARB
AXP
BAR
BIL
BNDX
BTAL
CCI
CHTR
CNBS
CNC
COF
EIX
EOPS
ETN
FLSP
FLT
FTLS
GE
GIGB
GLD
GM
GOVT
GPN
HDG
IAU
IAUM
IGSB
K
KMLM
KO
KRBN
LBAY
LQD
MARB
MJ
MSVX
MUB
Major Asset Class
alternatives
commodities
equity
Fixed Income
Avg Return
-0.005401
-0.004000
-0.002000
0.000000
0.002289
Risk vs. Risk-Adjusted Returns
Risk Adjusted Return
Sigma (Risk)
Returns by Time Horizon and Asset Class
Major Asset Class
return 12M
return 18M
return 24M
alternatives
commodities
equity
Fixed Income
Risk & Returns
Avg Daily Return
Avg. Sigma 12 Months


Paul Bistre's Portfolio Holdings
Major Asset Class / Minor Assets
alternatives
Count of Security Returns.csv
Null
Holdings Distribution by Asset Class
Holding Value Range ($)
Distinct count of Ticker
Ticker
BTAL
EOPS
FLSP
HDG
MARB
MSVX
RINF
RLY
UPAR
Major Asset Class
alternatives
commodities
equity
Fixed Income
Avg Return
-0.000984
-0.000500
0.000000
0.000500
0.001054
Risk vs. Risk-Adjusted Returns
Risk Adjuste..
Sigma (Risk)
Returns by Time Horizon and Asset Class
Major Asset Class
return 12M
return 18M
return 24M
alternatives
Risk & Returns
Avg Daily Ret..
Avg. Sigma 12 Months


Paul Bistre's Portfolio Holdings
Major Asset Class / Minor Assets
alter..
commodities
equity
Fixed Income
Null
cannabis
carbon
gold
oil
precious_metals
large_cap
small_cap
corporate
inv_grade_corp
Holdings Distribution by Asset Class
Holding Value Range ($)
Distinct count of Ticker
184K
Risk vs. Risk-Adjusted Returns
Risk Adjuste..
Sigma (Risk)
Returns by Time Horizon and Asset Class
Major Asset Class
return 12M
return 18M
return 24M
-13.7847
16.2964
24.7317
equity
Risk & Returns
Avg Daily Ret..
Avg. Sigma 12 Months
Ticker
AAAU
ACN
ARB
AXP
BAR
BIL
BNDX
BTAL
CCI
CHTR
CNBS
CNC
COF
EIX
EOPS
ETN
FLSP
FLT
FTLS
GE
GIGB
GLD
GM
GOVT
GPN
HDG
IAU
IAUM
IGSB
K
KMLM
KO
KRBN
LBAY
LQD
MARB
MJ
Major Asset Class
equity
Avg Return
0.001328


Paul Bistre's Portfolio Holdings
Major Asset Class / Minor Assets
Major Asset Class: equity
Holding Value Range ($): 376K
Minor Assets: large_cap
Ticker: CHTR
Count of Security Returns.csv: 1
Holdings Distribution by Asset Class
Holding Value Range ($)
Risk vs. Risk-Adjusted Returns
Sigma (Risk)
Returns by Time Horizon and Asset Class
Major Asset Class
alternatives
commodities
equity
Fixed Income
Risk & Returns
Avg. Sigma 12 Months
Ticker
Major Asset Class
Avg Return
-0.005401
-0.004000
-0.002000
0.000000
0.002289

Analysis of Return and Risk:

This report examines Paul Bistre's portfolio, concentrating on assets, risk, and performance returns. The report utilizes SQL for data extraction and Tableau for visualization, offering actionable insights into asset allocation, performance trends, and risk-adjusted returns to aid in strategic decision-making.

Main Insights from the Dashboard:

2.1 Breakdown of Portfolio Holdings

The "Portfolio Holdings" visualization emphasizes the allocation of assets among primary asset categories (such as alternatives, commodities, equity, and fixed income) and secondary assets (including large-cap, gold, and precious metals): The portfolio is primarily composed of equity, featuring substantial investments in large-cap stocks, leading to a high allocation.
Smaller allocations are made to commodities and fixed income, spread across oil and investment-grade corporate bonds.
Observation: The portfolio is predominantly composed of equities, which makes it vulnerable to market fluctuations.

2.2 Asset Class Distribution of Holdings

The “Holdings Distribution” histogram showcases asset holdings within different value ranges:

Most securities are categorized within the 0K–64K range.
Assets of higher value (>250K) mainly concentrate on equity, with minimal presence from different asset classes.
Insight: This suggests a disparity, highlighting reduced access to varied, high-value alternatives or commodities.

2.3 Returns Adjusted for Risk

The scatterplot on “Risk versus Risk-Adjusted Returns” examines the performance of securities: Equity assets offer greater returns but carry increased risk (sigma).
Fixed income and alternatives provide moderate, steady returns with reduced volatility.

Insight: Although equities yield returns, their risk-
adjusted returns suggest decreasing performance advantages in relation to risk.

2.4 Tradeoff Between Risk and Returns

The “Risk & Returns” graph contrasts average daily returns with sigma:
Assets show a distinct positive relationship between risk and returns.
Stocks show the highest volatility, while bonds and alternative investments tend to group n ear the low-risk, low-return range.
Insight: There are chances to achieve a balance between significant volatility and consisten t returns by means of diversification.

2.5 Returns by Time Horizon and Asset Class

The boxplot illustrates returns across 12M, 18M, and 24M timeframes:
Equity offers the broadest return spectrum, exhibiting greater variance
over extended time periods. Fixed income provides steady returns with low volatility.
Insight: Fixed-income assets offer stability, whereas commodities
and stocks yield greater returns
but necessitate extended holding times to mitigate volatility.

Business Insights:

1. **Overconcentration in Equities:**
   A considerable part of the portfolio is allocated to large-
   cap stocks, subjecting the client to market fluctuations.
   Although stocks provide substantial returns, they are associated with greater risk,
   as illustrated in the box plot and scatter plots.
2. **Lack of Diversification:**
   There are low allocations for fixed income and alternatives. These
   asset categories can stabilize returns and lessen overall portfolio volatility.
   Commodities and alternative investments may offer hedging prospects against decline s in equities.
3. **Risk-Return Tradeoff:**
   Stocks offer attractive risk-adjusted returns but exhibit high Sigma (risk).
   Fixed income offers consistent returns, albeit with low yield, making it suitable for portf olio stabilization.
4. **Time Horizon Performance:**

Equity returns continue to fluctuate over shorter periods but enhance over the long run.
Fixed income and commodities show more consistent performance across various t ime periods.

Actionable Recommendations:

Diversify Asset Allocation

Diversification is an essential concept in portfolio management that minimizes total risk and enhances stability against market fluctuations. The present portfolio assessment show s considerable concentration in stocks, creating both chances for greater returns and heightened volatility. To address this, a balanced allocation to fixed income and alternative assets is recommended.

Increase Exposure to Fixed Income and Alternatives

Fixed Income:

Investment-grade bonds and similar assets can offer consistent and reliable returns while safeguarding the portfolio during times of stock market declines. Investment-grade bonds typically exhibit less volatility and are supported by issuers possessing robust credit ratings. Bonds with medium to long-term maturities can be a good fit for a long-term investment outlook (18M–24M), providing steady interest income and minimizing short-term market risks.

Alternatives:

Assets such as gold act as a reliable safeguard against fluctuations in the stock market and rising inflation. Gold exhibits a low or negative correlation with stocks, indicating that it performs strongly when stocks falter, thereby offering stability to the overall portfolio. More over, other alternative investments, like real estate investment trusts (REITs) or infrastructur e funds, can enhance risk diversification and also aid in long-term value generation.

By diversifying into fixed income and alternatives, the portfolio becomes more robust against market volatility, improving stability while achieving a balanced risk-return tradeoff. This approach ensures that the client mitigates losses during economic downturns without compromising overall returns.

Optimize High-Performing Securities:

To enhance portfolio performance, hold onto equities that exhibit robust risk-adjusted returns, as shown in the Risk vs. Risk-Adjusted Returns scatterplot. These investments offer substantial returns while maintaining controllable risk, creating opportunities for growth. Stocks that are underperforming ought to be swapped for reliable fixed income options, like investment-grade bonds or stable alternatives, to decrease volatility and improve stability. Consistent performance evaluations will assist in recognizing reinvestment prospects in high-performing asset categories or new alternatives such as commodities.

Adopt a Long-Term Holding Strategy:

An investment period of 18–24 months in stocks reduces short-term fluctuations and enhances profits. Historical patterns indicate that stocks yield positive results when held over long durations, reducing the impact of short-term market variations. For the one-year outlook, concentrate on low-risk, capital-protecting investments, like fixed income securities and commodities, to shield against fluctuations in the equity market. This layered approach harmonizes expansion and security:

Long-Term (18M–24M): Growth-focused stocks with robust past performance.

Short-Term (12M): Fixed income investments for safeguarding capital and consistent returns.

Monitor Risk Metrics:

Consistent tracking of sigma (volatility) and average returns is crucial for managing the risk-return balance effectively. Securities that exhibit high volatility and provide low returns need to be recognized and proactively adjusted. Real-time dashboards facilitate effective monitoring of performance trends, supporting data-informed decisions.
Envision metrics such as sigma and returns over different timeframes (12M, 18M, 24M).

Recognize risks promptly to avert significant exposure to unstable assets.

Adjust the portfolio according to the latest performance insights.

Utilizing dashboards and automated reporting tools, the client can achieve an ideal risk-return balance, facilitating proactive management and prompt modifications.

Conclusion:

This analysis, provides a thorough assessment of portfolio performance, risk, and asset allocation utilizing essential metrics like holding value, risk-adjusted returns, average daily returns, and volatility (sigma) throughout different asset classes and time frames. The results indicate a significant dependence on stocks, leading to heightened overall portfolio risk and volatility, especially in short-term approaches. By expanding into fixed income and alternatives (such as gold), the client can greatly enhance return stability and reduce downside risk.

The enhancement of high-performing securities, as shown in the scatterplots and boxplots, will enable the portfolio to keep leading equities while redistributing funds from underperforming assets into fixed income, which has shown steadiness and dependability. This method guarantees a favorable risk-return ratio while preserving chances for sustainable growth over time.

Implementing a time-oriented approach is equally essential. A lengthy time frame (18M–24M) for stocks mitigates short-term fluctuations and enables the portfolio to take advantage of rising market trends. On the other hand, a 12-month approach focusing on fixed income assets offers stability and capital preservation, maintaining liquidity and managing risk amid unpredictable market conditions.

Consistent tracking of risk metrics (sigma) and returns will facilitate flexible modifications to the portfolio, ensuring it meets the client's changing financial goals. Dashboards can significantly impact this process by offering immediate visual insights into performance patterns and risk exposures.

By adopting the suggested strategies—diversification, enhancement of top performers, long-term perspectives, and ongoing evaluation—the client will attain a more robust, well-balanced, and high-performing portfolio. These practical steps aim to ensure steady growth while safeguarding against fluctuations, ultimately enhancing the client's financial objectives with increased certainty and accuracy.