Portfolio Risk Analysis Report

Report Date: October 23, 2025
Portfolio Size: 21 Assets
Analysis Period: 52 Weeks (Weekly Data)
Data Frequency: Weekly Adjusted Prices
Generated by: Automated Risk Analysis Pipeline

Risk Assessment Summary

HIGH RISK (RED): 12 Assets
MEDIUM RISK (YELLOW): 4 Assets
LOW RISK (GREEN): 5 Assets

Executive Summary

This report presents a comprehensive risk analysis of a portfolio containing 21 assets with a combined market capitalization of $12707.9 billion. Analysis is based on weekly adjusted price data covering approximately 52 weeks of trading history. **Key Findings:** • 12 assets (57.1%) are rated as HIGH RISK (RED) • 4 assets (19.0%) are rated as MEDIUM RISK (YELLOW) • Average portfolio volatility (annualized): 35.5% • Maximum drawdown observed: -54.7% **Risk Concentration:** The analysis reveals significant risk concentration in 16 assets requiring immediate attention and potential portfolio rebalancing. **Sentiment Analysis:** • 6 RED-flagged assets show negative market sentiment • Average sentiment score for flagged assets: -0.304 • News coverage indicates heightened market concern for these positions

Portfolio Overview

Sector Allocation

Sector	Assets	Market Cap ($B)	Percentage
Technology	7	8765.83	69.0%
Consumer Staples	2	1210.43	9.5%
Financial Services	2	875.97	6.9%
Energy	2	603.05	4.7%
Consumer Discretionary	5	535.78	4.2%
Healthcare	1	464.66	3.7%
Industrial	2	252.21	2.0%

Risk Analysis Results

Risk Distribution:
• HIGH RISK (RED): 12 assets
• MEDIUM RISK (YELLOW): 4 assets
• LOW RISK (GREEN): 5 assets

High Risk Assets

Symbol	Sector	Risk Rating	Volatility (Annualized)	Max Drawdown	Risk Score
NVDA	Technology	RED	53.9%	-48.9%	5
BLNK	Energy	RED	52.8%	-44.4%	4
SNAP	Technology	RED	44.2%	-42.7%	3
TSLA	Consumer Discretionary	RED	38.6%	-38.0%	3
GME	Consumer Discretionary	RED	37.1%	-54.7%	3
CRM	Technology	YELLOW	30.0%	-33.4%	2

SBUX	Consumer Discretionary	RED	35.6%	-31.3%	2
BA	Industrial	RED	40.9%	-25.9%	2
SHOP	Technology	RED	60.5%	-40.1%	2
SQ	Financial Services	YELLOW	23.9%	-38.0%	2
AMC	Consumer Discretionary	RED	44.9%	-50.7%	2
RIVN	Consumer Discretionary	RED	47.6%	-20.1%	2
AAPL	Technology	YELLOW	33.3%	-26.2%	1
PG	Consumer Staples	YELLOW	16.9%	-14.9%	1
UBER	Technology	RED	36.5%	-18.6%	1
SPCE	Industrial	RED	38.6%	-16.7%	1

Machine Learning Analysis

Advanced machine learning techniques were applied to identify anomalies and predict future risk ratings. **Anomaly Detection Summary:**
• Total Anomalies Detected: 3
• Critical Anomalies: 5
• High Risk Anomalies: 1
• Anomaly Rate: 14.3%
Risk Prediction Model:
• Model Accuracy: 85.7%
• Rating Changes Predicted: 1
• Assets Predicted to Deteriorate: 1
• Assets Predicted to Improve: 0

Key Machine Learning Insights

• 5 assets show critical anomalous behavior requiring immediate review
• 1 assets predicted to deteriorate in risk rating
• Anomaly detection identified 3 assets with unusual patterns
• Key risk drivers: Volatility, Max Drawdown, Volume Decline

Critical Anomalies Detected

Symbol	Sector	Anomaly Score	Severity	Recommendation
SHOP	Technology	100.0	CRITICAL	Critical anomaly - Consider immediate po...
AMC	Consumer Discretionary	86.2	CRITICAL	Critical anomaly - Consider immediate po...
JNJ	Healthcare	85.1	CRITICAL	Critical anomaly - Consider immediate po...
SQ	Financial Services	84.8	CRITICAL	Normal behavior pattern - Continue monit...
NVDA	Technology	80.9	CRITICAL	Normal behavior pattern - Continue monit...
BLNK	Energy	72.6	HIGH	Normal behavior pattern - Continue monit...

Predicted Risk Rating Changes

Symbol	Current Rating	Predicted Rating	Confidence	Trend
SQ	YELLOW	RED	49.0%	DETERIORATING

Top Risk Factors (Feature Importance)

1. Volatility: 26.3% importance
2. Max Drawdown: 23.0% importance
3. Volume Decline: 11.0% importance
4. Sharpe Ratio: 10.5% importance
5. Price Change 3M: 9.0% importance

ML Validation Results

Overall Validation Status: PASS
Checks Passed: 4 / 4

✓ **Anomaly Detection Validation:** PASS
total_assets: 21, anomalies_detected: 3, anomaly_rate: 14.3
✓ **Risk Prediction Validation:** PASS
model_accuracy: 85.7, predictions_made: 21, rating_changes: 1
✓ **Feature Quality Validation:** PASS
features_checked: 9, nan_features: 0, total_samples: 21
✓ **Feature Importance Validation:** PASS
total_importance: 100.0, top_feature: Volatility, top_importance: 26.3

Sentiment Analysis

Sentiment analysis was conducted on 12 RED-flagged assets using financial news from the past 12 months. **Key Findings:**
• Average sentiment score: -0.304
• Assets with negative sentiment: 6/12
• Total news articles analyzed: 289

Sentiment Analysis Results

Symbol	Sentiment Score	Label	News Count	Trend	Key Themes
GME	-0.462	NEGATIVE	24	STABLE	earnings, market_share, regulatory
RIVN	-0.430	NEGATIVE	19	DETERIORATING	market_share, regulatory, earnings
SPCE	-0.428	NEGATIVE	21	IMPROVING	earnings, regulatory, market_share
NVDA	-0.351	NEGATIVE	23	STABLE	earnings, market_share, regulatory
SHOP	-0.340	NEGATIVE	28	DETERIORATING	earnings, market_share, regulatory
BA	-0.315	NEGATIVE	29	DETERIORATING	earnings, market_share, operations
BLNK	-0.290	NEUTRAL	27	DETERIORATING	earnings, market_share, regulatory
SBUX	-0.266	NEUTRAL	21	DETERIORATING	earnings, market_share, regulatory

AMC	-0.225	NEUTRAL	16	DETERIORATING	earnings, market_share, regulatory
TSLA	-0.212	NEUTRAL	28	DETERIORATING	market_share, earnings, regulatory
UBER	-0.179	NEUTRAL	25	STABLE	earnings, market_share, regulatory
SNAP	-0.153	NEUTRAL	28	DETERIORATING	earnings, market_share, regulatory

Detailed Asset Analysis

Asset: NVDA

Sector: Technology
Current Price: $251.46
Market Cap: $399.65B
Risk Rating: RED
Risk Metrics:
• Volatility: 53.9%
• Maximum Drawdown: -48.9%
• Beta: 0.57
• Sharpe Ratio: -1.10
• RSI: 37.2
Performance:
• 1-Month Return: -27.0%
• 3-Month Return: -16.2%
• 6-Month Return: -33.7%
Risk Flags:
• High Volatility, Extreme Drawdown, Severe Decline, Poor Risk Return, Momentum Breakdown
Market Sentiment:
• Sentiment Score: -0.351 (NEGATIVE)
• News Articles: 23
• Trend: STABLE

Asset: BLNK

Sector: Energy
Current Price: $69.25
Market Cap: $114.01B
Risk Rating: RED
Risk Metrics:
• Volatility: 52.8%
• Maximum Drawdown: -44.4%
• Beta: -0.38
• Sharpe Ratio: -0.62
• RSI: 24.7
Performance:
• 1-Month Return: 0.3%
• 3-Month Return: -37.0%
• 6-Month Return: -8.7%
Risk Flags:
• High Volatility, Extreme Drawdown, Extended Decline, Poor Risk Return
Market Sentiment:
• Sentiment Score: -0.290 (NEUTRAL)
• News Articles: 27
• Trend: DETERIORATING

Asset: SNAP

Sector: Technology
Current Price: $7.77
Market Cap: $13.13B
Risk Rating: RED
Risk Metrics:
• Volatility: 44.2%
• Maximum Drawdown: -42.7%
• Beta: 0.16
• Sharpe Ratio: -0.56
• RSI: 29.2
Performance:
• 1-Month Return: -6.0%
• 3-Month Return: -20.5%
• 6-Month Return: -9.0%
Risk Flags:
• High Volatility, Extreme Drawdown, Poor Risk Return
Market Sentiment:
• Sentiment Score: -0.153 (NEUTRAL)
• News Articles: 28
• Trend: DETERIORATING

Asset: TSLA

Sector: Consumer Discretionary
Current Price: $160.51
Market Cap: $113.95B
Risk Rating: RED
Risk Metrics:
• Volatility: 38.6%
• Maximum Drawdown: -38.0%
• Beta: 1.03
• Sharpe Ratio: -0.64
• RSI: 37.7
Performance:
• 1-Month Return: 8.1%
• 3-Month Return: -14.1%
• 6-Month Return: 0.1%
Risk Flags:
• High Volatility, Extreme Drawdown, Poor Risk Return
Market Sentiment:
• Sentiment Score: -0.212 (NEUTRAL)
• News Articles: 28
• Trend: DETERIORATING

Asset: GME

Sector: Consumer Discretionary
Current Price: $140.04
Market Cap: $30.35B
Risk Rating: RED
Risk Metrics:
• Volatility: 37.1%
• Maximum Drawdown: -54.7%
• Beta: 1.10
• Sharpe Ratio: -1.47
• RSI: 42.9

Performance:
• 1-Month Return: 12.2%
• 3-Month Return: -1.0%
• 6-Month Return: -30.5%
Risk Flags:
• High Volatility, Extreme Drawdown, Poor Risk Return
Market Sentiment:
• Sentiment Score: -0.462 (NEGATIVE)
• News Articles: 24
• Trend: STABLE

Recommendations

Based on the comprehensive risk analysis, the following recommendations are provided:
Immediate Actions (RED-flagged assets):
1. Consider reducing position sizes for 12 high-risk assets
2. Implement stop-loss orders to limit further downside exposure
3. Review fundamental analysis for potential divestiture candidates
4. Monitor daily price movements and news flow closely

Medium-term Actions (YELLOW-flagged assets):
1. Conduct deeper due diligence on 4 medium-risk assets
2. Consider hedging strategies for positions with high volatility
3. Review correlation with overall portfolio risk
4. Set up enhanced monitoring and alerts

Portfolio-level Recommendations:
1. Diversify across sectors to reduce concentration risk
2. Consider alternative investments to reduce correlation
3. Implement systematic risk management framework
4. Schedule monthly portfolio risk reviews

Sentiment-based Actions:
1. Monitor news flow for 6 assets with negative sentiment
2. Consider contrarian opportunities if fundamentals remain strong
3. Assess impact of market sentiment on price movements
4. Review analyst coverage and institutional positioning

Appendix

Methodology

This risk analysis employs a five-stage pipeline methodology using weekly data: **Stage 1 - Data Ingestion:** • Weekly adjusted price data (~52 weeks of history) • Weekly trading volume information • Market capitalization data • Sector classifications • Data source: Alpha Vantage API (weekly adjusted series) **Stage 2 - Core Analysis:** • Volatility calculation (annualized using √52 factor for weekly data) • Maximum drawdown analysis on weekly cumulative returns • Beta coefficient estimation • Risk-adjusted return metrics (Sharpe ratio, annualized) • Technical indicators (RSI with 14-week period) • Price momentum analysis (4/13/26-week lookback periods) • Volume trend analysis (4/12-week windows) • Rule-based risk flagging system calibrated for weekly data **Stage 3 - ML Analysis:** • Anomaly detection using Isolation Forest algorithm • Risk prediction using Random Forest Classifier • Feature importance analysis • ML validation and quality checks **Stage 4 - Sentiment Analysis:** • News article collection for RED-flagged assets only • Natural language processing for sentiment scoring (TextBlob) • Trend analysis and confidence metrics • Key theme extraction from financial news **Stage 5 - Report Generation:** • Comprehensive risk assessment compilation • Visual data presentation with weekly time axes • Actionable recommendations • Professional PDF report output with CSV exports

Risk Assessment Thresholds

RED Flag Thresholds (calibrated for weekly data): • Volatility > 35% (annualized from weekly returns using √52) • Maximum drawdown < -20% • Volume decline > 50% (comparing 4-week vs 12-week averages) • 1-month price decline > 15% **YELLOW Flag Thresholds (calibrated for weekly data):** • Volatility > 22% (annualized from weekly returns using √52) • Maximum drawdown < -10% • Volume decline > 30% • Multiple warning indicators present **Sentiment Thresholds:** • Negative sentiment: Score < -0.3 • Positive sentiment: Score > 0.3 • Neutral sentiment: -0.3 ≤ Score ≤ 0.3

Report Generation Details:
• Generated: 2025-10-23 17:42:12
• Analysis Period: 12 months
• Total Assets Analyzed: 21
• Pipeline Version: 1.0

Test Data - Portfolio Details

Complete portfolio and risk analysis data has been exported to CSV files for further analysis:

Portfolio Data CSV: portfolio_data_20251023_174212.csv
Risk Analysis CSV: risk_analysis_20251023_174212.csv

The tables below provide summary information for quick reference.

Performance Metrics Data

Symbol	1M Return	3M Return	6M Return	Vol Decline	Sharpe Ratio
AAPL	1.2%	21.0%	23.8%	-21.9%	0.56
AMC	41.3%	26.4%	-11.3%	11.8%	-0.37
BA	-2.1%	-7.1%	21.7%	-1.2%	1.30
BLNK	0.3%	-37.0%	-8.7%	9.8%	-0.62
CRM	5.4%	-4.5%	-3.9%	0.1%	-0.73
GME	12.2%	-1.0%	-30.5%	7.6%	-1.47
JNJ	7.4%	15.5%	26.8%	-2.3%	1.63
MSFT	1.8%	1.5%	33.3%	-15.9%	1.14
NVDA	-27.0%	-16.2%	-33.7%	-15.9%	-1.10
PG	-0.2%	-3.9%	-4.8%	-2.5%	-0.59
RIVN	-5.5%	3.0%	17.0%	7.6%	0.16
SBUX	2.5%	-8.8%	3.4%	-0.1%	-0.24
SHOP	15.5%	30.2%	66.8%	4.1%	0.97
SNAP	-6.0%	-20.5%	-9.0%	-3.6%	-0.56
SPCE	-1.6%	-7.5%	6.2%	22.0%	0.57
SQ	-9.6%	-18.8%	-27.4%	4.4%	-2.02
TSLA	8.1%	-14.1%	0.1%	26.5%	-0.64
UBER	-6.3%	1.0%	18.6%	-22.2%	0.80
V	2.4%	-3.1%	3.4%	-10.9%	0.59
WMT	3.9%	10.2%	13.2%	-12.3%	1.08
XOM	-2.1%	4.9%	7.6%	-18.7%	-0.01

Risk Flags Details

Symbol	High Vol	Ext. DD	Vol Collapse	Severe Dec	Ext. Dec	Poor Sharpe	Mom. Break
NVDA	✓	✓	✗	✓	✗	✓	✓
BLNK	✓	✓	✗	✗	✓	✓	✗
SNAP	✓	✓	✗	✗	✗	✓	✗
TSLA	✓	✓	✗	✗	✗	✓	✗

GME	✓	✓	✗	✗	✗	✓	✗
CRM	✗	✓	✗	✗	✗	✓	✗
SBUX	✓	✓	✗	✗	✗	✗	✗
BA	✓	✓	✗	✗	✗	✗	✗
SHOP	✓	✓	✗	✗	✗	✗	✗
SQ	✗	✓	✗	✗	✗	✓	✗
AMC	✓	✓	✗	✗	✗	✗	✗
RIVN	✓	✓	✗	✗	✗	✗	✗
AAPL	✗	✓	✗	✗	✗	✗	✗
PG	✗	✗	✗	✗	✗	✓	✗
UBER	✓	✗	✗	✗	✗	✗	✗
SPCE	✓	✗	✗	✗	✗	✗	✗
MSFT	✗	✗	✗	✗	✗	✗	✗
JNJ	✗	✗	✗	✗	✗	✗	✗
V	✗	✗	✗	✗	✗	✗	✗
WMT	✗	✗	✗	✗	✗	✗	✗
XOM	✗	✗	✗	✗	✗	✗	✗

Data Summary:
- Total Assets: 21
- Data Generated: 2025-10-23 17:42:12
- Note: This test data is provided for further analysis, validation, and detailed review purposes.
- All metrics are calculated from 252 trading days of historical data.