# Portfolio Risk Analysis Report

**Report Date:** February 23, 2026
**Portfolio Size:** 50 Assets
**Analysis Period:** 12 Months
**Generated by:** Automated Risk Analysis Pipeline

## Risk Assessment Summary

**HIGH RISK (RED):** 8 Assets
**MEDIUM RISK (YELLOW):** 0 Assets
**LOW RISK (GREEN):** 42 Assets

# Executive Summary

This report presents a comprehensive risk analysis of a portfolio containing 50 assets with a combined market capitalization of $5850.6 billion. **Key Findings:** • 8 assets (16.0%) are rated as HIGH RISK (RED) • 0 assets (0.0%) are rated as MEDIUM RISK (YELLOW) • Average portfolio volatility: 44.6% • Maximum drawdown observed: -70.1% **Risk Concentration:** The analysis reveals significant risk concentration in 8 assets requiring immediate attention and potential portfolio rebalancing. **Sentiment Analysis:** • 7 RED-flagged assets show negative market sentiment • Average sentiment score for flagged assets: -0.355 • News coverage indicates heightened market concern for these positions

# Portfolio Overview

## Sector Allocation

| Sector | Assets | Market Cap ($B) | Percentage |
|---|---|---|---|
| Healthcare | 6 | 1063.25 | 18.2% |
| Industrial | 8 | 1062.64 | 18.2% |
| Technology | 6 | 920.96 | 15.7% |
| Real Estate | 4 | 709.19 | 12.1% |
| Consumer Staples | 6 | 611.44 | 10.5% |
| Energy | 8 | 470.52 | 8.0% |
| Financial Services | 4 | 465.07 | 7.9% |
| Consumer Discretionary | 4 | 361.40 | 6.2% |
| Utilities | 3 | 157.17 | 2.7% |
| Materials | 1 | 28.97 | 0.5% |

# Risk Analysis Results

**Risk Distribution:**
• HIGH RISK (RED): 8 assets
• MEDIUM RISK (YELLOW): 0 assets
• LOW RISK (GREEN): 42 assets

## High Risk Assets

| Symbol | Sector | Risk Rating | Volatility | Max Drawdown | Risk Score |
|---|---|---|---|---|---|
| MTL | Technology | RED | 80.0% | -61.8% | 5 |
| CRO | Financial Services | RED | 88.1% | -70.1% | 5 |
| GFZ | Real Estate | RED | 54.0% | -43.8% | 5 |
| CZN | Energy | RED | 56.2% | -53.0% | 5 |
| GCO | Consumer Discretionary | RED | 62.2% | -58.9% | 5 |

| | | | | | |
|---|---|---|---|---|---|
| AZU | Energy | RED | 128.7% | -62.7% | 2 |
| PIN | Financial Services | RED | 69.8% | -64.5% | 2 |
| NYE | Consumer Staples | RED | 64.7% | -62.0% | 2 |

# Machine Learning Analysis

Advanced machine learning techniques were applied to identify anomalies and predict future risk ratings. **Anomaly Detection Summary:**
• Total Anomalies Detected: 8
• Critical Anomalies: 1
• High Risk Anomalies: 6
• Anomaly Rate: 16.0%
**Risk Prediction Model:**
• Model Accuracy: 93.3%
• Rating Changes Predicted: 1
• Assets Predicted to Deteriorate: 0
• Assets Predicted to Improve: 1

## Key Machine Learning Insights

• 1 assets show critical anomalous behavior requiring immediate review
• Anomaly detection identified 8 assets with unusual patterns
• Key risk drivers: Max Drawdown, Volatility, Sharpe Ratio

## Critical Anomalies Detected

| Symbol | Sector | Anomaly Score | Severity | Recommendation |
|---|---|---|---|---|
| AZU | Energy | 100.0 | CRITICAL | Critical anomaly - Consider immediate po... |
| GFZ | Real Estate | 77.1 | HIGH | Significant anomaly - Conduct thorough d... |
| PIN | Financial Services | 76.0 | HIGH | Significant anomaly - Conduct thorough d... |
| CRO | Financial Services | 75.4 | HIGH | Significant anomaly - Conduct thorough d... |
| MTL | Technology | 68.7 | HIGH | Significant anomaly - Conduct thorough d... |
| CZN | Energy | 61.8 | HIGH | Significant anomaly - Conduct thorough d... |
| GCO | Consumer Discretionary | 61.0 | HIGH | Significant anomaly - Conduct thorough d... |

## Predicted Risk Rating Changes

| Symbol | Current Rating | Predicted Rating | Confidence | Trend |
|---|---|---|---|---|
| AZU | RED | GREEN | 54.0% | IMPROVING |

## Top Risk Factors (Feature Importance)

1. Max Drawdown: 27.0% importance
2. Volatility: 16.5% importance
3. Sharpe Ratio: 14.4% importance
4. Price Change 6M: 14.0% importance
5. Rsi: 13.3% importance

### ML Validation Results

**Overall Validation Status:** PASS
**Checks Passed:** 4 / 4

✓ **Anomaly Detection Validation:** PASS
total_assets: 50, anomalies_detected: 8, anomaly_rate: 16.0
✓ **Risk Prediction Validation:** PASS
model_accuracy: 93.3, predictions_made: 50, rating_changes: 1
✓ **Feature Quality Validation:** PASS
features_checked: 9, nan_features: 0, total_samples: 50
✓ **Feature Importance Validation:** PASS
total_importance: 100.0, top_feature: Max Drawdown, top_importance: 27.0

## Sentiment Analysis

Sentiment analysis was conducted on 8 RED-flagged assets using financial news from the past 12 months. **Key Findings:**
• Average sentiment score: -0.355
• Assets with negative sentiment: 7/8
• Total news articles analyzed: 171

### Sentiment Analysis Results

| Symbol | Sentiment Score | Label | News Count | Trend | Key Themes |
|---|---|---|---|---|---|
| GFZ | -0.448 | NEGATIVE | 24 | IMPROVING | regulatory, operations, management |
| PIN | -0.404 | NEGATIVE | 24 | DETERIORATING | regulatory, financial_health, earnings |
| MTL | -0.353 | NEGATIVE | 20 | DETERIORATING | regulatory, financial_health, growth |
| CZN | -0.352 | NEGATIVE | 26 | DETERIORATING | regulatory, earnings, market_share |
| GCO | -0.352 | NEGATIVE | 25 | STABLE | earnings, regulatory, financial_health |
| CRO | -0.335 | NEGATIVE | 16 | IMPROVING | regulatory, earnings, financial_health |
| NYE | -0.334 | NEGATIVE | 17 | STABLE | financial_health, earnings, regulatory |
| AZU | -0.262 | NEUTRAL | 19 | STABLE | earnings, regulatory, operations |

## Detailed Asset Analysis

### Asset: MTL

**Sector:** Technology
**Current Price:** $106.44
**Market Cap:** $12.14B
**Risk Rating:** RED
**Risk Metrics:**
• Volatility: 80.0%
• Maximum Drawdown: -61.8%
• Beta: 0.04
• Sharpe Ratio: 0.15
• RSI: 28.9
**Performance:**
• 1-Month Return: -47.8%
• 3-Month Return: -57.0%
• 6-Month Return: -44.7%
**Risk Flags:**
• High Volatility, Extreme Drawdown, Severe Decline, Extended Decline, Momentum Breakdown
**Market Sentiment:**
• Sentiment Score: -0.353 (NEGATIVE)
• News Articles: 20
• Trend: DETERIORATING

## Asset: CRO

**Sector:** Financial Services
**Current Price:** $136.65
**Market Cap:** $126.16B
**Risk Rating:** RED
**Risk Metrics:**
• Volatility: 88.1%
• Maximum Drawdown: -70.1%
• Beta: 0.12
• Sharpe Ratio: 0.25
• RSI: 21.5
**Performance:**
• 1-Month Return: -66.5%
• 3-Month Return: -45.2%
• 6-Month Return: -35.0%
**Risk Flags:**
• High Volatility, Extreme Drawdown, Severe Decline, Extended Decline, Momentum Breakdown
**Market Sentiment:**
• Sentiment Score: -0.335 (NEGATIVE)
• News Articles: 16
• Trend: IMPROVING

## Asset: GFZ

**Sector:** Real Estate
**Current Price:** $103.01
**Market Cap:** $44.48B
**Risk Rating:** RED
**Risk Metrics:**
• Volatility: 54.0%
• Maximum Drawdown: -43.8%
• Beta: 0.03
• Sharpe Ratio: -0.01
• RSI: 20.3
**Performance:**
• 1-Month Return: -30.6%

• 3-Month Return: -40.1%
• 6-Month Return: -29.3%
**Risk Flags:**
• High Volatility, Extreme Drawdown, Severe Decline, Extended Decline, Momentum Breakdown
**Market Sentiment:**
• Sentiment Score: -0.448 (NEGATIVE)
• News Articles: 24
• Trend: IMPROVING

## Asset: CZN

**Sector:** Energy
**Current Price:** $116.98
**Market Cap:** $50.76B
**Risk Rating:** RED
**Risk Metrics:**
• Volatility: 56.2%
• Maximum Drawdown: -53.0%
• Beta: -0.14
• Sharpe Ratio: -0.60
• RSI: 30.5
**Performance:**
• 1-Month Return: -14.2%
• 3-Month Return: -45.9%
• 6-Month Return: -35.8%
**Risk Flags:**
• High Volatility, Extreme Drawdown, Extended Decline, Poor Risk Return, Momentum Breakdown
**Market Sentiment:**
• Sentiment Score: -0.352 (NEGATIVE)
• News Articles: 26
• Trend: DETERIORATING

## Asset: GCO

**Sector:** Consumer Discretionary
**Current Price:** $173.53
**Market Cap:** $149.94B
**Risk Rating:** RED
**Risk Metrics:**
• Volatility: 62.2%
• Maximum Drawdown: -58.9%
• Beta: -0.24
• Sharpe Ratio: -0.19
• RSI: 28.3
**Performance:**
• 1-Month Return: -19.7%
• 3-Month Return: -44.7%
• 6-Month Return: -39.4%
**Risk Flags:**
• High Volatility, Extreme Drawdown, Severe Decline, Extended Decline, Momentum Breakdown
**Market Sentiment:**
• Sentiment Score: -0.352 (NEGATIVE)
• News Articles: 25
• 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 8 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 0 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 7 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 four-stage pipeline methodology: **Stage 1 - Data Ingestion:** • Historical price data (252 trading days) • Trading volume information • Market capitalization data • Sector classifications **Stage 2 - Core Analysis:** • Volatility calculation (annualized) • Maximum drawdown analysis • Beta coefficient estimation • Risk-adjusted return metrics (Sharpe ratio) • Technical indicators (RSI) • Rule-based risk flagging system **Stage 3 - Sentiment Analysis:** • News article collection (12-month lookback) • Natural language processing for sentiment scoring • Trend analysis and confidence metrics • Key theme extraction **Stage 4 - Report Generation:** • Comprehensive risk assessment compilation • Visual data presentation • Actionable recommendations • Professional PDF report output

## Risk Assessment Thresholds

**RED Flag Thresholds:** • Volatility > 40% (annualized) • Maximum drawdown < -20% • Volume decline > 50% • 1-month price decline > 15% **YELLOW Flag Thresholds:** • Volatility > 25% (annualized) • 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: 2026-02-23 20:55:12
• Analysis Period: 12 months
• Total Assets Analyzed: 50
• 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_20260223_205512.csv
**Risk Analysis CSV:** risk_analysis_20260223_205512.csv

The tables below provide summary information for quick reference.

## Performance Metrics Data

| Symbol | 1M Return | 3M Return | 6M Return | Vol Decline | Sharpe Ratio |
|---|---|---|---|---|---|
| ALK | 2.4% | 4.2% | 6.6% | 0.7% | 0.58 |
| AOE | -1.4% | 1.3% | 6.9% | -0.9% | 0.51 |
| AWS | -0.5% | 5.2% | 11.6% | 2.5% | 0.55 |
| AZU | 99.2% | 115.9% | 117.2% | 4.3% | 0.33 |
| BDXL | -0.3% | 3.6% | 15.2% | 2.9% | 0.77 |
| BE | -0.8% | 1.4% | 3.2% | 1.0% | 0.43 |
| BEIA | -0.6% | 5.8% | 13.0% | 2.7% | 0.72 |
| BTWY | 3.3% | 2.4% | 9.9% | -0.4% | 0.66 |
| BZU | 3.5% | 0.8% | 7.6% | 0.2% | 0.50 |
| CAC | 3.5% | 7.2% | 11.0% | 0.2% | 0.72 |
| CM | 3.5% | 3.7% | 7.7% | 0.2% | 0.74 |
| CRO | -66.5% | -45.2% | -35.0% | -4.2% | 0.25 |
| CZN | -14.2% | -45.9% | -35.8% | -4.3% | -0.60 |
| DY | -1.2% | 7.0% | 6.5% | -0.1% | 0.70 |
| GC | 2.4% | 2.2% | 8.7% | 0.2% | 0.59 |
| GCO | -19.7% | -44.7% | -39.4% | -5.8% | -0.19 |
| GEZA | 1.5% | 1.8% | 12.4% | -2.4% | 0.67 |
| GFZ | -30.6% | -40.1% | -29.3% | -18.5% | -0.01 |
| GXTA | -0.2% | 1.2% | 6.9% | 1.4% | 0.58 |
| MDOG | 2.3% | 4.9% | 5.7% | -0.7% | 0.52 |
| MKF | 2.0% | 3.5% | 3.4% | 2.2% | 0.51 |
| MTL | -47.8% | -57.0% | -44.7% | 3.4% | 0.15 |
| MYY | -1.8% | 0.1% | 8.9% | 2.1% | 0.39 |
| NQU | 2.6% | 3.6% | 6.5% | 2.4% | 0.58 |
| NU | -1.7% | 4.5% | 6.5% | 1.3% | 0.51 |
| NYE | 2.8% | 17.7% | -23.5% | -3.8% | -0.09 |
| PIN | 68.6% | 2.9% | -16.0% | 3.7% | -0.20 |
| PJZ | 4.1% | 5.9% | 8.9% | 3.3% | 0.49 |
| RL | 0.7% | 3.1% | 9.3% | 2.5% | 0.70 |
| RR | 0.3% | 3.6% | 3.8% | 1.8% | 0.46 |

| | | | | | |
|---|---|---|---|---|---|
| RXM | 3.4% | 1.8% | 11.2% | 3.3% | 0.67 |
| SD | 1.8% | 5.2% | 7.5% | 1.2% | 0.56 |
| SQFE | 2.0% | 5.4% | 6.8% | 3.5% | 0.42 |
| SRD | -1.1% | 6.1% | 5.7% | 1.7% | 0.58 |
| SYMI | 4.2% | 1.5% | 4.1% | 0.9% | 0.45 |
| TBH | 0.6% | 2.9% | 6.3% | 1.1% | 0.54 |
| TIB | 0.3% | 5.1% | 8.6% | 1.5% | 0.45 |
| TO | 3.8% | 8.1% | 11.3% | 0.9% | 0.81 |
| TRN | 2.5% | 6.3% | 10.4% | 2.1% | 0.69 |
| TT | -1.2% | 5.8% | 8.0% | 1.6% | 0.48 |
| VFE | 2.4% | 7.3% | 8.6% | 3.2% | 0.59 |
| VL | 2.8% | 5.7% | 10.5% | 3.3% | 0.72 |
| VLT | 4.5% | 8.5% | 11.5% | 2.1% | 0.80 |
| VRP | 1.2% | 7.1% | 9.0% | -0.7% | 0.54 |
| VUV | 0.6% | 3.7% | 12.3% | 2.5% | 0.72 |
| XE | 1.8% | 5.3% | 11.7% | -0.4% | 0.78 |
| XLN | -0.3% | 1.8% | 10.4% | -0.9% | 0.49 |
| XNI | -1.0% | 2.7% | 11.7% | -0.2% | 0.56 |
| ZHFN | 2.2% | 5.6% | 12.3% | 2.2% | 0.64 |
| ZW | 0.7% | 1.7% | 11.4% | 2.1% | 0.66 |

## Risk Flags Details

| Symbol | High Vol | Ext. DD | Vol Collapse | Severe Dec | Ext. Dec | Poor Sharpe | Mom. Break |
|---|---|---|---|---|---|---|---|
| MTL | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| CRO | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| GFZ | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| CZN | ✓ | ✓ | ✗ | ✗ | ✓ | ✓ | ✓ |
| GCO | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| AZU | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| PIN | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| NYE | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| MYY | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| XLN | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| BDXL | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| BE | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| TRN | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| ZW | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| NQU | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| VFE | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PJZ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| GEZA | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| SRD | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| CAC | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| TT | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| BZU | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| TIB | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| MKF | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| SQFE | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| SYMI | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| GC | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| ALK | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| VL | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| VLT | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| MDOG | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| ZHFN | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| TBH | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| XNI | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| VRP | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| RR | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| NU | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| RXM | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| SD | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| RL | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| GXTA | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| TO | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| BEIA | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| AOE | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| XE | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| VUV | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| BTWY | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| AWS | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| CM | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| DY | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |

**Data Summary:**

- Total Assets: 50
- Data Generated: 2026-02-23 20:55:12
- 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.