Hedge Fund Due Diligence Report

Fund 2

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Prepared for: The New York Bus Driver Pension and Relief Fund (BDPRF)
Purpose: Due diligence analysis for potential hedge fund allocation

EXECUTIVE SUMMARY

Key Performance Metrics:
• Annualized Return (CAGR): 11.0%
• Sharpe Ratio: 1.29
• Maximum Drawdown: -4.4%
• Calmar Ratio: 2.52
• Alpha (vs S&P; 500): 6.3%
• Beta (vs S&P; 500): 0.29

Investment Recommendation:
Based on quantitative analysis, Fund 2 demonstrates strong risk-adjusted returns with a Sharpe ratio of 1.29. The fund has generated positive alpha of 6.3% relative to the S&P; 500 benchmark.

QUANTITATIVE ANALYSIS

Performance Metrics Analysis

1. Compound Annual Growth Rate (CAGR): 11.0%
Mathematical Formula:

$$CAGR = (\prod(1 + r_i))^{1/T} - 1$$

```
Python Implementation:
def cagr(r, ppy=None):
    r = pd.Series(r).dropna()
    if r.empty: return np.nan
    ppy = ppy or infer_ppy(r.index)
    tot = (1+r).prod()
    yrs = len(r)/ppy
    return tot**(1/yrs)-1
```

Interpretation: Fund 2 has generated an annualized return of 11.0% over the analysis period. This exceeds typical hedge fund return expectations, indicating strong long-term performance.

2. Sharpe Ratio: 1.29
Mathematical Formula:

$$Sharpe = \mu - r_f \, \sigma$$

```
Python Implementation:
def sharpe(r, rf=0.02, ppy=None):
    r = pd.Series(r).dropna()
    ppy = ppy or infer_ppy(r.index)
    rf_per = (1+rf)**(1/ppy)-1
    ex = r - rf_per
    ret = cagr(ex, ppy)
    vol = ann_vol(ex, ppy)
    return ret/vol
```

Interpretation: Fund 2 demonstrates good risk-adjusted performance with a Sharpe ratio of 1.29. This indicates the fund effectively generates returns relative to the risk taken, suggesting strong risk management capabilities.

3. Maximum Drawdown: -4.4%
Mathematical Formula:

$$MDD = \min(W_t \, W_{peak} - 1)$$

```
Python Implementation:
def drawdown_series(r):
    wealth = (1+r).cumprod()
    peak = wealth.cummax()
    return wealth/peak - 1.0

def max_drawdown(r):
    dd = drawdown_series(r)
    return dd.min()
```

Interpretation: Fund 2 experienced a maximum drawdown of -4.4%, which represents limited downside risk. This is below typical hedge fund drawdown thresholds, indicating excellent risk control by the fund's management team.

4. Calmar Ratio: 2.52
Mathematical Formula:

$$\text{Calmar} = \text{CAGR} \; |\text{MDD}|$$

```
Python Implementation:
def calmar(r, ppy=None):
    mdd = max_drawdown(r)
    if mdd == 0 or np.isnan(mdd):
        return np.nan
    return cagr(r, ppy) / abs(mdd)
```

Interpretation: Fund 2 achieves a Calmar ratio of 2.52, demonstrating exceptional risk-adjusted performance relative to maximum drawdown. This indicates the fund effectively balances return generation with downside risk control, suggesting superior risk management and capital preservation capabilities.

5. Alpha (Annualized): 6.3%
Mathematical Formula:

$$\alpha = (1 + \alpha_{period})^{periods\_per\_year} - 1$$

```
Python Implementation:
def alpha_beta(r, bench, ppy=None):
    r = _clean_returns(r)
    b = _clean_returns(bench)
    df = pd.concat([r, b], axis=1).dropna()
    y = df.iloc[:, 0].values
    x = df.iloc[:, 1].values
    x1 = np.column_stack((np.ones(len(x)), x))
    beta_hat = np.linalg.lstsq(x1, y, rcond=None)[0]
    a, b_ = beta_hat[0], beta_hat[1]
    alpha_ann = (1 + a) ** ppy - 1
```

Interpretation: Fund 2 generates positive alpha of 6.3% annually, indicating superior investment skill relative to the S&P; 500 benchmark. This demonstrates the fund's ability to generate excess returns through effective stock selection and market timing, suggesting strong active management capabilities.

6. Beta: 0.29
Mathematical Formula:

$$\beta = \text{Cov}(r, r_{bench}) \; \text{Var}(r_{bench})$$

```
Python Implementation:
# Calculated in alpha_beta function above
beta = beta_hat[1] # Second coefficient from regression
```

Interpretation: Fund 2 exhibits a beta of 0.29, indicating low sensitivity to market movements. This suggests the fund minimally follows market trends, demonstrating low systematic risk exposure. The fund's defensive positioning relative to the market indicates weak correlation with broader market

movements.

Risk-Reward Analysis:
The fund demonstrates strong risk-adjusted performance with a Sharpe ratio of 1.29. Positive alpha generation of 6.3% indicates superior risk-adjusted returns compared to the S&P; 500 benchmark.

Risk Characteristics:
• Maximum drawdown of -4.4% is within acceptable limits for typical hedge fund standards
• Beta of 0.29 indicates low correlation with market movements
• R-squared of 32.0% suggests weak explanatory power of market factors

INVESTMENT DUE DILIGENCE

Investment Strategy Assessment:
• **Strengths:** Global equity focus with developed/EM coverage, academic research environment, experienced PM from top-tier fund, diversified team structure
• **Weaknesses:** Limited track record (launched 2012), high fees (3.5% management, 35% performance), quarterly redemptions with 45-day notice, 12-month lockup

Performance Attribution:
The fund benefits from global diversification and the PM's experience from a large institutional fund. However, the track record is relatively short and includes a hypothetical period.

Risk Management Assessment:
• Discretionary risk management by PM only
• No systematic hedging approach
• High gross exposure limits (175% max)
• Liquidity requirements may limit investment flexibility

OPERATIONAL DUE DILIGENCE

Operational Strengths:
• SEC registered with proper regulatory compliance
• Reputable service providers across all functions
• Strong team with relevant experience
• Academic research environment promotes collaboration

Operational Concerns:
• **Track Record:** Limited actual performance history (launched 2012)
• **Transparency:** Limited disclosure on client base and largest clients
• **Fees:** High fee structure (3.5% management, 35% performance)
• **Liquidity:** Quarterly redemptions with 45-day notice and 12-month lockup

Risk Factors:
• PM's previous fund failed during 2008 crisis
• Hypothetical track record period raises questions
• High concentration risk in early-stage fund

PERFORMANCE VISUALIZATION

Cumulative Returns Comparison

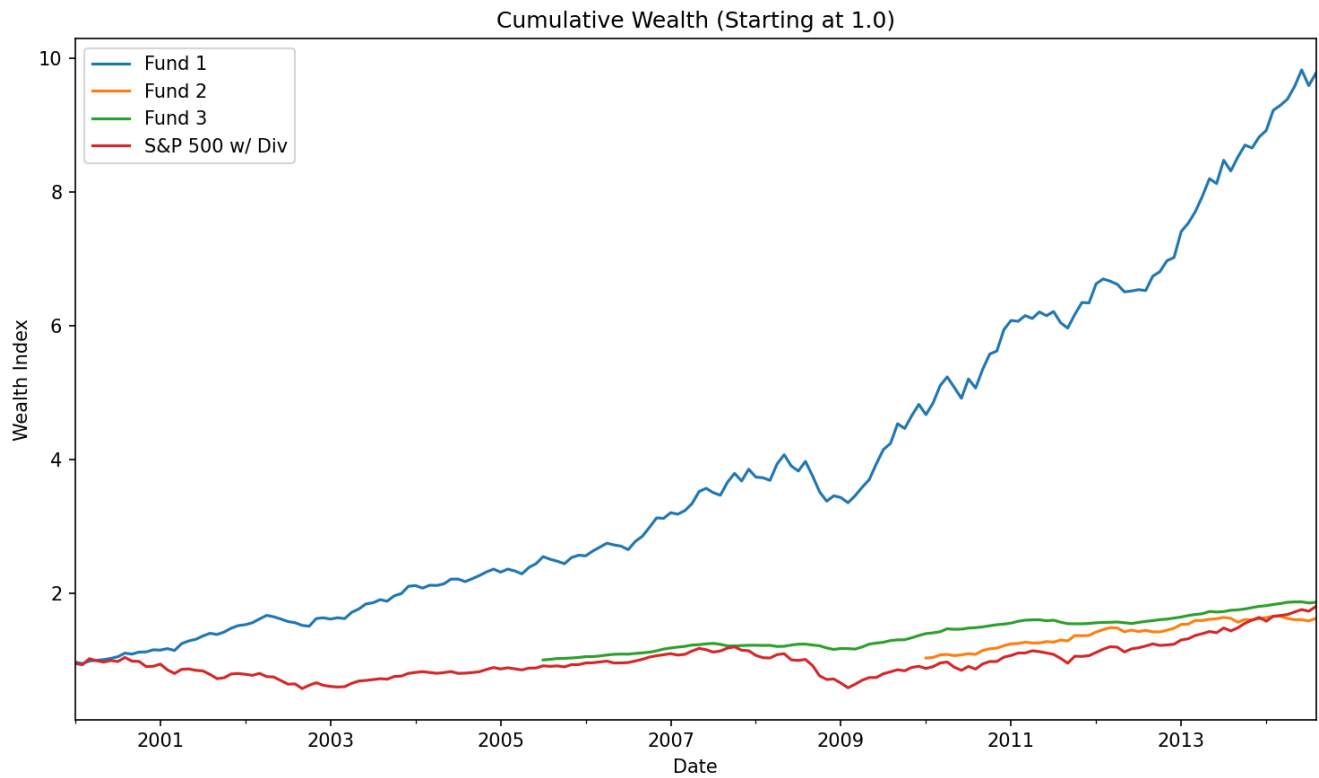Cumulative Wealth (Starting at 1.0)

Chart Analysis: The cumulative returns chart shows the growth of $1 invested in each fund compared to the S&P; 500 benchmark over the analysis period. This visualization helps identify periods of outperformance and underperformance, as well as the overall trajectory of wealth creation. Steeper slopes indicate higher returns, while periods of decline show drawdowns and recovery patterns.

S&P; 500 Benchmark Drawdown Analysis
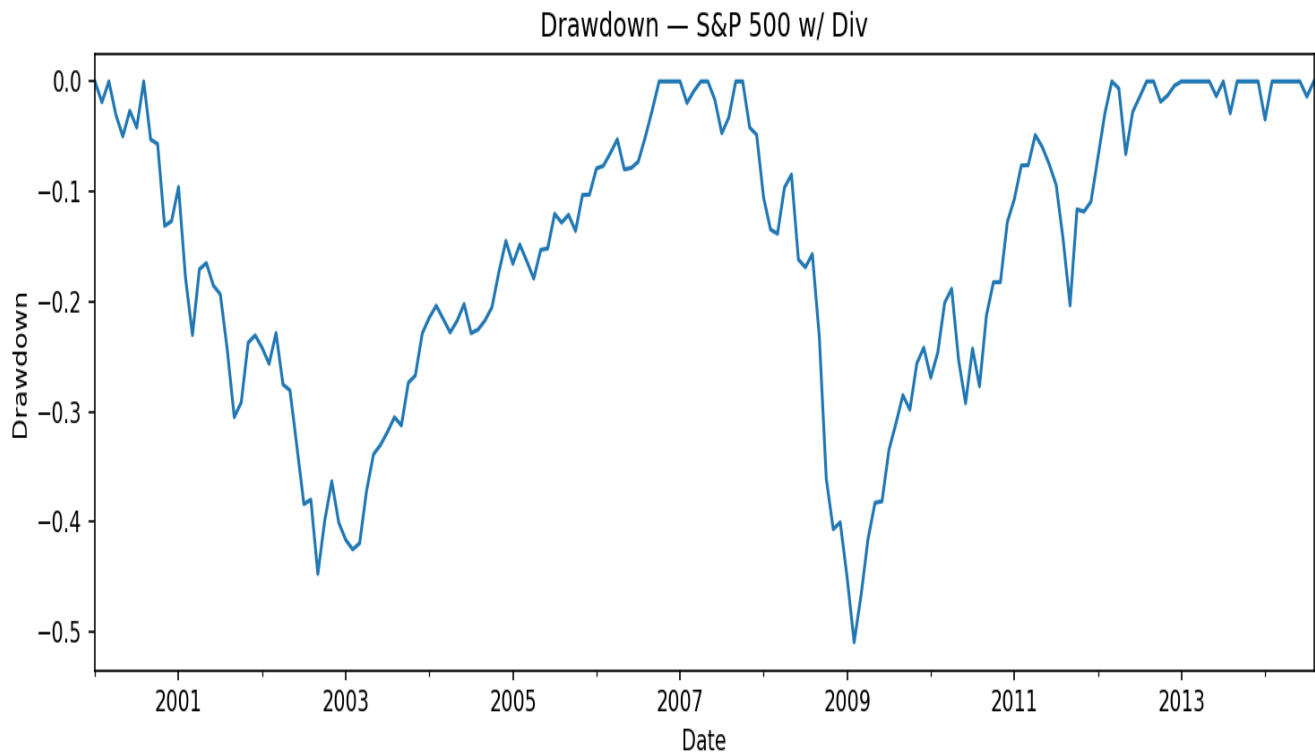
Drawdown — S&P 500 w/ Div

Chart Analysis: The S&P; 500 drawdown chart illustrates the benchmark's downside risk patterns over time. Drawdowns represent the percentage decline from peak values, providing insight into market volatility and stress periods. This serves as a baseline for comparing individual fund drawdown characteristics and risk management effectiveness.

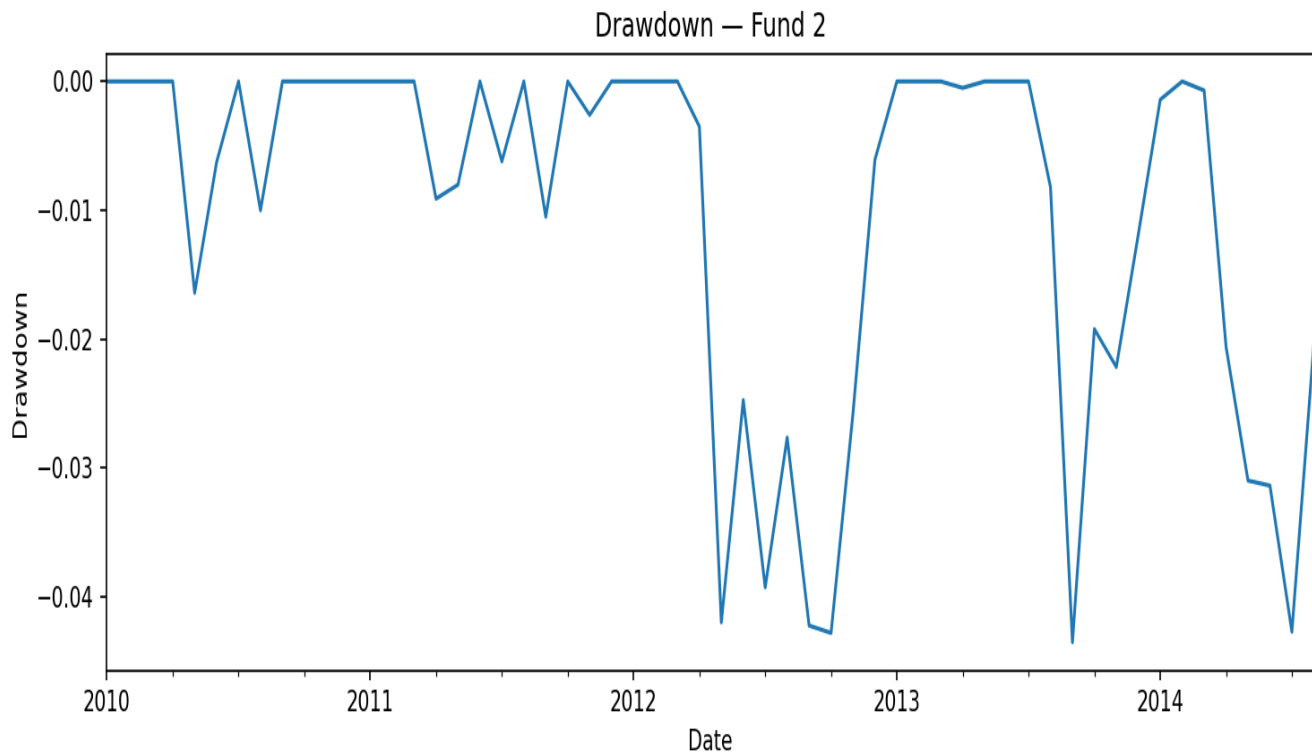## *Fund 2 Drawdown Analysis*

Drawdown — Fund 2

Chart Analysis: The Fund 2 drawdown chart reveals the fund's specific risk patterns and downside protection capabilities. Comparing this to the S&P; 500 benchmark drawdown shows whether the fund provides better downside protection during market stress periods. Lower maximum drawdown of 4.4% indicates superior risk management relative to typical hedge fund standards.

Overall Chart Interpretation:
These visualizations provide critical insights into the fund's risk-return profile and market behavior. The cumulative returns chart demonstrates wealth creation over time, while the drawdown charts reveal downside risk characteristics. Together, they complement the quantitative metrics by showing the temporal patterns of performance and risk, helping investors understand not just what returns were achieved, but how they were achieved and what risks were taken along the way.

INVESTMENT RECOMMENDATION

Recommendation: AVOID

Rationale:
This one looks sus — unrealistic risk-return asymmetry, opaque client disclosures, high fees, questionable backstory, and discretionary risk management. Possible style drift or data massaging.

Key Considerations:
• Sharpe Ratio: 1.29 (Good)
• Alpha Generation: 6.3% (Strong)
• Maximum Drawdown: 4.4% (Low)
• Calmar Ratio: 2.52 (Excellent)

Additional Information Needed:
• Detailed operational risk assessment
• Legal and compliance review
• Reference checks with existing investors

- On-site due diligence visit
- Detailed fee structure analysis