Year – End Presentation

Undergraduate Student Investment Management Fund – Team A

Friday April 23rd, 2021
Team Introduction

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April 23rd, 2021
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Investment Thesis
Akbas, Jiang, and Koch hypothesize that investment horizon of an insider establishes a pattern for expected trading behavior, thus helping them to identify unexpected trades.

Bill Gates from 1996 - 2013 vs.
Trades from short horizon insiders are informative.

When long horizon insiders deviate from their expected patterns of buying/selling, these trades are even more informative than the typical short horizon insider’s trade.

Measuring Insider Horizon and Strength

Akbas, Jiang, and Koch use Horizon (HOR) and Strength (STR), these two variables help them measure insider trading. The formulas are as follows:

\[ HOR_{i,j,t} = \left| \frac{\sum_{y=T-10}^{year(t-1)} IOF_{i,j,y}}{N} \right| \times (-1) \]

\[ STR_{i,j,t} = \frac{P_{i,j,t} - S_{i,j,t}}{VOL_{j,t}} \]

<table>
<thead>
<tr>
<th>-1</th>
<th>-0.5</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long</td>
<td>Mid</td>
<td>Short</td>
</tr>
<tr>
<td>Lower STR</td>
<td>Higher STR</td>
<td></td>
</tr>
<tr>
<td>Weaker Purchase</td>
<td>Stronger Purchase</td>
<td></td>
</tr>
</tbody>
</table>

Unexpectedness in Long Horizon Insiders

Unexpectedness determines how far a given purchase of a long horizon insider deviates from the benchmark expectation associated with the insider's investment horizon.

\[ UNEXP_{i,j,t} = CURRENT_{i,j,t} - HOR_{i,j,t} \]

<table>
<thead>
<tr>
<th></th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>Unexpected Sales from LH</td>
<td>Unexpected Sales from SH</td>
<td>Expected Purchase from LH</td>
<td>Unexpected Purchases from SH</td>
<td>Unexpected Purchases from LH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Strategy Implementation
Portfolio Construction Overview

Phase 1
- Collect historical data on universe of equities
- Historical insider data processed to calculate historical horizon (HOR)
- Scraper runs on SEC filings collecting current data

Phase 2
- Calculate: Short and Long horizon trades based on UNEXP and STR
- Invest in equities that match HOR and STR criteria
- Hold and rebalance every month
## Portfolio Weighting

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Factor</th>
<th>Assigned Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Horizon</td>
<td>Strength (STR)</td>
<td>1.5% allocation</td>
</tr>
<tr>
<td>Long Horizon</td>
<td>Unexpectedness (UNEXP)</td>
<td>2% allocation</td>
</tr>
<tr>
<td></td>
<td>Strength (STR)</td>
<td></td>
</tr>
</tbody>
</table>
Portfolio Allocation

![Chart showing portfolio allocation from 01/29/21 to 04/9/21. The chart includes Passive Portfolio (91.74%, 4/22/21), Active Portfolio (7.5%, 4/22/21), Funds Portfolio, Equity Portfolio, and Cash Portfolio (0.76%, 4/22/21).]
Performance
Performance

Active Portfolio vs. Russell 3000
- Active Portfolio Return: 22.90%
- IWW Return: 15.28%
- Excess Return: 7.62%

Total Portfolio vs. Russell 3000
- Total Portfolio Return: 16.76%
- IWW Return: 15.28%
- Excess Return: 1.48%
Performance

Active Portfolio vs. S&P 500

- Active Portfolio Return: 22.90%
- SPY Return: 14.60%
- Excess Return: 8.30%

Total Portfolio vs. S&P 500

- Total Portfolio Return: 16.76%
- SPY Return: 14.60%
- Excess Return: 2.16%
Attribution
Average Weights (Active Portfolio)

Active Portfolio Average Allocation
by Market Cap

- Large: 47.22%
- Mid: 26.39%
- Small: 26.39%

Active Portfolio Average Allocation
by Sector

- Financials: 33.99%
- Real Estate: 17.42%
- Industrials: 10.75%
- Consumer Staples: 8.63%
- Health Care: 8.31%
- Consumer Discretionary: 8.26%
- Utilities: 6.72%
- Materials: 3.55%
- Communication Services: 1.75%
- Information Technology: 1.64%

April 23rd, 2021
Student Investment Management Fund – Team A
Attribution (Short Horizon Signals)
Attribution (Long Horizon Signals)
Exceptions
Exceptions (Top 3)

HHC 24.64% (HPR); 10.50% (IWM)
Purchased: 1/11/21  Sold: 2/11/21
News: Accelerated plans for future buildings throughout the United States.
Signals: **STR**: 1.51  **HOR**: -0.15  **UNEXP**: 0.78
Signals: **STR**: 0.0004, **HOR**: -0.33, **UNEXP**: 0.67

MYE 21.79% (HPR); 7.04% (IWM)
Purchased: 11/25/20  Sold: 12/30/20
News: Over the last year has paid out more than three quarters of its free cash flow generated. Upgraded to overweight by Keybanc on 12/18.
Signals: **STR**: 0.002, **HOR**: -0.33, **UNEXP**: 0.67

UMBF 21.73% (HPR); 6.67% (IWM)
Purchased: 2/4/21  Sold: 3/8/21
News: Benefitted from rising interest rates and a strong financial sector
Signals: **STR**: 0.0011, **HOR**: -0.88, **UNEXP**: 0.12
QDEL -23.07% (HPR); 1.93% (IWM)
Purchased: 2/23/21   Sold: 3/22/21
News: CEO announced worst-case estimates for revenue that marked a 49% drop from the previous quarter; decline in COVID cases/tests; analysts dropped EPS estimates by an average of 17%
Signals:  STR: 0.0008   HOR: -0.055   UNEXP: 0.95

INSM -22.74% (HPR); -0.31% (IWM)
Purchased: 3/9/21   Sold 4/12/21
News: Japan approved special treatment ARIKAYCE for nontuberculous mycobacterial (NTM) lung disease; already approved in Europe/US.
Signals:  STR: 0.0008   HOR: -0.14   UNEXP: 0.86

PFSI -10.64 (HPR); -1.72% (IWM)
Purchased: 3/10/21   Sold: 4/12/21
News: Stock positions dropped by 6% from institutional holdings
Signals:  STR: 0.06   HOR: -0.15   UNEXP: 0.85
Signal Decay

Average Cumulative Returns (Market Adjusted)
Thank You. Questions?
Student Investment Management Fund

Spring 2021 Presentation
Strategy
Portfolio Strategy

- Value
- Momentum
- Cash Based Operating Profitability

Target Universe
Selecting the Investable Universe

Building & Rebalancing the portfolio requires an initial screening in Bloomberg to reduce the universe of securities to a manageable level, removing any that fall outside of ASU Charter Requirements.
Cash Based Operating Profitability Ratio

The resulting numerical figure will be added to the Value and Momentum factors, producing the final ranking used to select the highest 65 stocks for the portfolio.

Cash-based operating profitability
= Operating profitability
  + Decrease in accounts receivable (RECCH)
  + Decrease in inventory (INVCH)
  + Increase in accounts payable and accrued liabilities (APALCH).

Equity

Operating Income (Losses): Current Quarter
Accounts & Notes Receivable: Q & Q-1
Inventories: Q & Q-1
Accounts Payable: Q & Q-1
Accrued Liabilities & Expenses: Q & Q-1
Total Equity

Applies Factor Weighting
Model Calculates CBOP Ratio
Solution is Factored into Final Stock Ranking

Equity
Scoring and Ranking

All stocks are scored & sorted by Sector

Top 65 ranked are selected
Portfolio Turnover and Sector Concentration
Turnover by Month

Portfolio Turnover

Jan: 22%
Feb: 30%
Mar: 38%
Sector Concentration

**Portfolio Sector Concentration**
- Information Technology: 19%
- Consumer Discretionary: 14%
- Health Care: 15%
- Financials: 10%
- Consumer Staples: 7%
- Energy: 5%
- Real Estate: 3%
- Materials: 5%
- Industrials: 13%
- Communication Services: 9%

**Russell 3000 Sector Concentration**
- Information Technology: 26%
- Consumer Discretionary: 12%
- Industrials: 10%
- Financials: 11%
- Utilities: 3%
- Consumer Staples: 6%
- Energy: 3%
- Materials: 2%
Current Size Concentration

MARKET CAP CONCENTRATION (INVESTMENT VALUE)

- Large Cap: 11%
- Mid Cap: 40%
- Small Cap: 49%

COUNT OF STOCKS BY MARKET CAP

- Large Cap: 9
- Mid Cap: 25
- Small Cap: 11
Performance
### Cumulative Performance

<table>
<thead>
<tr>
<th>SIM Fund Team B vs Russell 3000 ETF</th>
<th>SIM Fund Team B vs Russell 2000 ETF</th>
<th>SIM Fund Team B vs Vanguard Quality U.S. Factor ETF</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM Fund Team B</td>
<td>SIM Fund Team B</td>
<td>SIM Fund Team B</td>
</tr>
<tr>
<td>I-Shares Russell 3000 ETF</td>
<td>I-Shares Russell 2000 ETF</td>
<td>Vanguard Quality U.S. Factor ETF</td>
</tr>
<tr>
<td>28.60%</td>
<td>28.60%</td>
<td>28.60%</td>
</tr>
<tr>
<td>17.97%</td>
<td>23.76%</td>
<td>23.44%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIM Fund Team B vs Vanguard Value ETF</th>
<th>SIM Fund Team B vs AQR Small Cap Momentum Fund</th>
<th>SIM Fund Team B vs Avantis Small Cap Value ETF</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIM Fund Team B</td>
<td>SIM Fund Team B</td>
<td>SIM Fund Team B</td>
</tr>
<tr>
<td>Vanguard Value Index Fund ETF</td>
<td>AQR Small Cap Momentum Style Fund</td>
<td>Avantis US Small Cap Value ETF</td>
</tr>
<tr>
<td>28.60%</td>
<td>28.60%</td>
<td>28.60%</td>
</tr>
<tr>
<td>18.84%</td>
<td>20.66%</td>
<td>36.44%</td>
</tr>
</tbody>
</table>
Factor Contribution

The graph shows the factor contribution for various factors:

- **US:US Market**: 19.11
- **Value:US Value**: 12.78
- **Size:US Size**: 2.53
- **Profit:US Profit**: 0.98
- **Momentum:US Momentum**: -3.34

These factors contribute to the overall performance in different ways.
Utilities Comparison

SIM Fund Team B vs Utilities

- SIM Fund Team B: 28.60%
- I-Shares Utilities ETF: 7.62%
- SIM Team B With Utilities: 28.83%
Challenges Faced

- QEP – QEP Resources
- CXP - Columbia Property Trust
- Rebalance issues
- Cash Management
Thank You
APPENDIX
Stock - Netgear Inc. (NTGR)
- CBOP Ratio = 0.03
- P/B Ratio = 1.45
- YTD Return = 26.40%

\[
\text{Score} = \frac{P}{B} (\text{Profitability Weight}) + \frac{V}{P} (\text{Value Weight}) + \text{YTD Return} (\text{Momentum Weight})
\]

\[
-0.37 = 0.03(0.5) + 1.45(-0.3) + 0.264(0.2)
\]

The highest 65 stocks according to score are ranked and selected after controlling for sector exposure.
Exclude if any of the following are true for a particular stock:

<table>
<thead>
<tr>
<th>Exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Based Operating Profitability Ratio or Free Cash Flow to Equity Ratio cannot be calculated.</td>
</tr>
<tr>
<td>Return on Equity &lt; 0%</td>
</tr>
<tr>
<td>Exchange Traded Funds (ETFs)</td>
</tr>
<tr>
<td>Free Cash Flow to Equity Ratio &lt; 0</td>
</tr>
<tr>
<td>Price to Book Ratio = 0</td>
</tr>
<tr>
<td>YTD Return &lt; -20% or = 0%</td>
</tr>
</tbody>
</table>
Investment Thesis

Value + Profitability + Momentum
Cash-Based Operating Profitability

- CBOP is a stronger predictor of future returns than profitability alone.
- Hedge against unprofitable value stocks.
- CBOP is expected to result in higher Sharpe ratios.

\[
y = \alpha + \beta_{\text{MKT}} \text{MKT} + \beta_{\text{RMW}} \text{RMW}_{\text{cbOP}} + \beta_{\text{HML}} \text{HML} + \beta_{\text{UMD}} \text{UMD} + \epsilon
\]

Source: Ball Et al., Journal of Financial Economics
$y = \alpha + \beta_{MKT}MKT + \beta_{HML}HML + \beta_{RMW}RMW_{cbOP} + \beta_{UMD}UMD + \epsilon$
Momentum

YTD Returns

Exclude
Include

\[ y = \alpha + \beta_{MKT} \cdot MKT + \beta_{RMW} \cdot RMW_{cbOP} + \beta_{HML} \cdot HML + \beta_{UMD} \cdot UMD + \epsilon \]
Sector Weights

PORTFOLIO SECTOR CONCENTRATION

- Information Technology: 19%
- Consumer Discretionary: 16%
- Industrials: 12%
- Financials: 12%
- Health Care: 14%
- Consumer Staples: 8%
- Communication Services: 10%
- Energy: 3%
- Real Estate: 3%
- Materials: 3%
- Utilities: 0%

RUSSELL 3000 SECTOR CONCENTRATION

- Information Technology: 26%
- Consumer Discretionary: 12%
- Industrials: 11%
- Financials: 11%
- Health Care: 14%
- Consumer Staples: 6%
- Communication Services: 10%
- Energy: 3%
- Real Estate: 3%
- Materials: 3%
- Utilities: 10%
Portfolio Development & Implementation Process

Source data from Bloomberg: Accounting and Stock Returns

Phase 1

Input stock data into Portfolio Model

Phase 2

Calculate Cash Based Operating Profitability Ratio

Calculate YTD Returns & Price/Book Ratio

Apply Factor Weights & Rank Stocks

Phase 3

Sort by Sector, Weight Stocks, & Invest in top 65 Stocks according to Rank

Rebalance Monthly
Assign weights based on stock rank

Compare current weights to charter requirements

Final sector weights

Add back to stocks in sectors below limits

Reduce evenly all stocks within sector to adhere to charter requirements
Individual Stock Weights

<table>
<thead>
<tr>
<th>Range</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1-10</td>
<td>~3%</td>
</tr>
<tr>
<td>#11-37</td>
<td>~1.5%</td>
</tr>
<tr>
<td>#38-65</td>
<td>~1%</td>
</tr>
</tbody>
</table>