MONITORING AND ADAPTING TO QUANT FACTOR ROTATION

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The quant world is changing ever more rapidly. What can we do in response?

1. **Smart Holdings**: Track what factors are currently popular and predict where the big crowds are moving next

2. **Factor Rotation**: Explore how different macroeconomic conditions drive performance of different quant factors

3. **QA Studio**: Customize strategies based on overall market conditions, in different times and places
   - See what works under different macroeconomic regimes
   - Find out what is working in different global markets and sectors
AGENDA

• Monitoring Factor Popularity with Smart Holdings

• Predicting Factor Performance with Datastream Macroeconomics

• Adapting to Factor Regime Changes with QA Studio

• Customizing Strategies to Different Market Conditions with QA Studio
Smart Holdings predicts what stocks are going to be bought by institutions and mutual funds - the “smart money”.

<table>
<thead>
<tr>
<th>Region</th>
<th>Avg IC</th>
<th>Bottom Decile</th>
<th>Top Decile</th>
<th>Spread</th>
<th>Max Drawdown</th>
<th>Sharpe Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>0.057</td>
<td>-4.1%</td>
<td>22.1%</td>
<td>24.7%</td>
<td>-17.2%</td>
<td>1.78</td>
</tr>
<tr>
<td>North America</td>
<td>0.045</td>
<td>-2.8%</td>
<td>17.0%</td>
<td>12.7%</td>
<td>-34.9%</td>
<td>0.61</td>
</tr>
<tr>
<td>Developed Europe</td>
<td>0.070</td>
<td>-9.6%</td>
<td>15.4%</td>
<td>24.5%</td>
<td>-20.3%</td>
<td>1.76</td>
</tr>
<tr>
<td>Developed Asia</td>
<td>0.078</td>
<td>-8.2%</td>
<td>25.7%</td>
<td>35.9%</td>
<td>-7.9%</td>
<td>2.57</td>
</tr>
<tr>
<td>Emerging Markets</td>
<td>0.057</td>
<td>-1.4%</td>
<td>25.5%</td>
<td>25.0%</td>
<td>-12.1%</td>
<td>1.65</td>
</tr>
<tr>
<td>Japan</td>
<td>0.047</td>
<td>-7.4%</td>
<td>8.8%</td>
<td>16.0%</td>
<td>-12.0%</td>
<td>1.38</td>
</tr>
</tbody>
</table>

Our model is based on predicting which stocks are going to be bought by institutional managers by identifying the unique investment profile (value, growth, momentum, etc.….) of each institutional investor, and then determining which stocks best fit each investor’s unique profile.
The “typical” methods used to follow the smart money using 13-F holdings data don’t work out of the box.

Traditional approaches and shortfalls

• **Best Ideas (Cohen)**
  – Identify high conviction holdings as holdings that differ significantly from index weight or average portfolio weight
  – Invest in high conviction names
  – Works well until ~2002 and then alpha disappears

• **Hedge Fund Holdings**
  – Buy names held by significant number of hedge funds
  – Only works if you knew what they held at the end of the qtr, falls apart with 45 day lag in 13-F filings

• **Buy “what worked last month”**
  – Worked for a while in the old days, then became very volatile in more recent times of market turbulence

Ownership-based models are profitable only to the extent that they can be **predictive** of institutional behavior.

Holdings data is reported to SEC at a substantial lag to the quarter end (typically 45 days).

Comparison of returns to a naïve ownership model assuming three horizons of data availability:

<table>
<thead>
<tr>
<th></th>
<th>Data Available</th>
<th>Perfect Data</th>
<th>Perfect Foresight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annualized Return</strong></td>
<td>-9.97%</td>
<td>-0.62%</td>
<td>46.60%</td>
</tr>
<tr>
<td><strong>Sharpe Ratio</strong></td>
<td>-0.05</td>
<td>-0.06</td>
<td>4.78</td>
</tr>
<tr>
<td><strong>Max Drawdown</strong></td>
<td>-69%</td>
<td>-25%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Larger changes in institutional ownership lead to more buying pressure and higher prices.

Quarterly rebalance, perfect foresight model

Source: Thomson Reuters & StarMine research
By reverse-engineering fund manager decisions, we have built a predictive model of buys and sells.

![Graph showing Decile of Aggregate Screens and Net Securities with Positive Change in Institutional Ownership](image)

![Graph showing Rank Correlation with Institutional Ownership Change at Different Horizons](image)
StarMine Smart Holdings Model

Data Sets used:
Thomson Reuters Ownership Feed (OP)
Reuters Fundamentals
Datastream pricing

- Fund Preferences
- Peer Holdings

Screening Component
Change Component

StarMine SmartHoldings Model
The 25 Factors used to generate fund profiles

<table>
<thead>
<tr>
<th>Value</th>
<th>Growth</th>
<th>Leverage</th>
<th>Momentum</th>
<th>Profitability</th>
<th>Sentiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>F12m E/P</td>
<td>G1 EPS</td>
<td>Debt / Book</td>
<td>LT PriceMo</td>
<td>ROE</td>
<td>FY1 EPS Chg (30 day)</td>
</tr>
<tr>
<td>T12m CF/P</td>
<td>G1 REV</td>
<td>Debt / Assets</td>
<td>Basic PriceMo</td>
<td>ROA</td>
<td>FY2 EPS Chg (30 day)</td>
</tr>
<tr>
<td>T12m B/P</td>
<td>F5Y CAGR</td>
<td>Int Coverage</td>
<td>Volume (t30 day avg)</td>
<td>Net Margin</td>
<td>Rec Chg (30 day)</td>
</tr>
<tr>
<td>T12m EBITDA/P</td>
<td>T5Y EPS CAGR</td>
<td>F12M EV / Sales</td>
<td>Basic Accruals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T12m Div/P</td>
<td>LTG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F12m Div/P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Screening Component: Fund Preferences

For each owner-factor pair, we not only determine if the owner is using the factor in their process, but the relative importance of each factor.

Cells highlighted in blue indicate an owner-factor where the owner shows preference towards that factor. Each owner occupies a column, and each factor a row. This allows us to determine exactly what is important to each owner, and ultimately, what the market will be purchasing next.

Vanguard Growth Equity Fund (VGEQX)

Top 5 Factors
- Basic PriceMo
- Long Term PriceMo
- StarMine ARM
- EPS Long Term Growth
- FY1 Revenue Growth

Bottom 5 Factors
- F12M Dividend Yield
- Price / Intrinsic Value
- EV / Sales
- Relative Value
- F12M Earnings Yield
The most popular fundamental ratios (across all funds) change over time.

<table>
<thead>
<tr>
<th>1999</th>
<th>2001</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>StarMine PriceMo</td>
<td>EPS_CAGR3</td>
<td>ROE</td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
</tr>
<tr>
<td>LTG</td>
<td>ROE</td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
</tr>
<tr>
<td>G5 EPS</td>
<td>EPS</td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
</tr>
<tr>
<td>Debt/Assets</td>
<td>ROE</td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
</tr>
<tr>
<td>Interest Coverage</td>
<td>EPS</td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
</tr>
<tr>
<td></td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Profit Margin</td>
<td>Interest Coverage</td>
<td>LTG</td>
<td>F12m E/P</td>
<td></td>
</tr>
<tr>
<td></td>
<td>StarMine EQ</td>
<td>StarMine PriceMo</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Price momentum and growth factors dominate

ROE, Earnings Quality and value factors dominate

The shift from growth to value matches intuition around how investors approached these different market regimes.

in-sample years 1999-2007
Screening Component: Peer Holdings

We utilize analyst and industry peer information to determine if a fund is already concentrated in a given peer group.

We found that incorporating peer ownership into our model added value by determining which securities have high peer ownership levels at funds.

Performance for Ownership model by peer quintile

[Bar chart showing average monthly spread by peer ownership quintile.]
Change Component

• We monitor securities across all fundamental factors and also look at changes to capture stocks becoming more (or less) aligned with the Street.

• Securities that are beginning to show up on managers’ screens are of special interest. These names are potentially new targets for funds and are increasing the alignment of their fundamentals with the preferences of funds.

• Example screen result:
Each component produces good risk-adjusted returns with low drawdowns and adds to good performance of the overall global model.

<table>
<thead>
<tr>
<th>Screening Component</th>
<th>Annualized Return</th>
<th>25.62%</th>
<th>Annualized Sharpe Ratio</th>
<th>1.64</th>
<th>Worst Drawdown</th>
<th>-21.46%</th>
<th>IC</th>
<th>0.060</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Component</td>
<td>Annualized Return</td>
<td>9.67%</td>
<td>Annualized Sharpe Ratio</td>
<td>1.99</td>
<td>Worst Drawdown</td>
<td>-2.93%</td>
<td>IC</td>
<td>0.022</td>
</tr>
<tr>
<td>Final Combination</td>
<td>Annualized Return</td>
<td>24.70%</td>
<td>Annualized Sharpe Ratio</td>
<td>1.78</td>
<td>Worst Drawdown</td>
<td>-17.20%</td>
<td>IC</td>
<td>0.057</td>
</tr>
</tbody>
</table>

Smart Holdings Cumulative Return (Global)

Top 98.5% global securities
Global performance of Smart Holdings model

Annualized Sharpe Ratio by Region/Year/Sector

Average Information Coefficient
Model correlations to existing StarMine factors are relatively low.

<table>
<thead>
<tr>
<th></th>
<th>ARM</th>
<th>ValMo</th>
<th>RV</th>
<th>IV</th>
<th>EQ</th>
<th>PriceMo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Model</td>
<td>0.32</td>
<td>0.48</td>
<td>0.32</td>
<td>0.26</td>
<td>0.24</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Portfolio ‘Quant’-centration: What fraction of the top/bottom deciles selected by the SmartHoldings model overlap with the top/bottom deciles of other StarMine factors?

<table>
<thead>
<tr>
<th></th>
<th>Top Decile</th>
<th>Bottom Decile</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM</td>
<td>10.7%</td>
<td>22.0%</td>
</tr>
<tr>
<td>ValMo</td>
<td>17.2%</td>
<td>38.4%</td>
</tr>
<tr>
<td>RV</td>
<td>23.0%</td>
<td>31.8%</td>
</tr>
<tr>
<td>IV</td>
<td>8.1%</td>
<td>11.5%</td>
</tr>
<tr>
<td>EQ</td>
<td>14.4%</td>
<td>28.7%</td>
</tr>
<tr>
<td>PriceMo</td>
<td>14.9%</td>
<td>21.2%</td>
</tr>
</tbody>
</table>
StarMine Smart Holdings uses Ownership data to follow the “Smart Money”.

- Some Smart Holdings lessons (and debunking):
  - Lags in reporting kill performance of buying backward-looking holdings
  - Don’t buy names others already bought, identify the factors they are buying
- Leverages a relatively “underutilized” data set
- Our approach is different from the literature
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STARMINE RESEARCH NOTE

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Factor Timing in US equities

In this research note we construct a model that times quantitative alpha factors. As the alpha of quantitative factors has declined in recent years, it has become increasingly important to accurately time factors. We present a factor timing framework based on macroeconomic and market data available from Thomson Reuters Datastream.

- Identify & model the drivers of factor returns
We assert that factor returns are primarily driven by the level of the equity risk premium. Further exploration shows that the equity risk premium can be estimated using macroeconomic data. We then construct a model that predicts factor returns by using macro inputs as forecasting variables.
Many alpha factors that have historically generated positive returns have not worked recently.

- Static weighting alpha factors within a multifactor quant model ignores the reality of non-constant factor efficacy

- Achieving alpha now benefits greatly from the accurate timing of quant factors. Dynamic weighting can help.
There are many possible approaches to factor timing. This study looks at a simple macro-based approach.

Choose Meaningful Forecasting Variables

Macroeconomic Variables
Trailing Factor Returns

Model Relationships to Quant Factors

Simple Linear Regression
Non-Linear Relationships

Develop Weighting Scheme

Linear Weighting Optimization
We choose 11 alpha factors that are popular among quantitative managers and represent several popular investing styles.

<table>
<thead>
<tr>
<th>Investing Style</th>
<th>Quantitative Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>F12M EPS yield</td>
</tr>
<tr>
<td></td>
<td>Book/Price</td>
</tr>
<tr>
<td></td>
<td>F12M Dividend Yield</td>
</tr>
<tr>
<td>Growth</td>
<td>FY1 EPS Growth</td>
</tr>
<tr>
<td></td>
<td>T5Y CAGR</td>
</tr>
<tr>
<td>Leverage</td>
<td>Debt/Equity</td>
</tr>
<tr>
<td></td>
<td>Interest Coverage Ratio</td>
</tr>
<tr>
<td>Profitability</td>
<td>ROE</td>
</tr>
<tr>
<td></td>
<td>ROA</td>
</tr>
<tr>
<td>Momentum</td>
<td>FY1 EPS Change 30 Day</td>
</tr>
<tr>
<td></td>
<td>Price Change 180 Day</td>
</tr>
</tbody>
</table>

Our goal is different from the academic literature which tends to focus on modeling outperformance broad style indexes: our aim is to give quantitative portfolio managers a method to dynamically weight alpha factors present in their portfolio construction process.
Different factors work at different times, even among classic value factors.
Investors implicitly or explicitly reweight allocation to quant factors based on their perception of the effect of macro conditions.

- By changing exposure to quant factors an investor can invest in groups of stocks with different risk characteristics.

- Academic literature argues that cashflow measures are affected by credit (business cycle) conditions:
  - Profitability factor (ROE) = risk-off trade
  - Leverage factor (D/A) = risk-on trade

- So these 11 alpha factors are not just factors used by quantitative managers but are also intuitively on the receiving end of changes in credit conditions.
Alpha factor returns are the result of taking on risk in the market. The equity risk premium is a driver of market risk and can be modeled with macro factors.

- We model the dynamics of changing alpha factor efficacy by changes in the equity risk premium, which are driven by macro economic variables.

The equity risk premium is composed of a “real” risk premium based on business conditions and a risk perception based on investors’ perceptions of the effect of macro conditions on the equity premium.
We narrow a list of popular economic macro variables based on predictability ($R^2$) and use a VRP to model investor risk perception.

<table>
<thead>
<tr>
<th>Macro Economic Variables</th>
<th>Forecasting Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIX</td>
<td>Credit spread</td>
</tr>
<tr>
<td></td>
<td>TermSpread</td>
</tr>
<tr>
<td></td>
<td>CPI, 1M Chg</td>
</tr>
<tr>
<td></td>
<td>M1 Money supply, 1M chg</td>
</tr>
<tr>
<td></td>
<td>3M UST rate</td>
</tr>
<tr>
<td>Investor Risk</td>
<td>Variance Risk Premium (Realized Volatility – VIX)</td>
</tr>
</tbody>
</table>

Datastream provides “as published” instead of revised numbers.

Thomson Reuters Velocity Analytics tick analysis platform is used to calculate realized volatility of the S&P 500 based on 5-minute intervals over last 90 days.
Datastream provides a top-down perspective.

• Datastream is the world’s largest financial statistical database
  – more than 140 million time series
  – over 10,000 datatypes
  – over 3.5 million instruments and indicators
  – world’s most referenced macro database

• Enables portfolio managers and analysts to:
  – Leverage sector-specific knowledge
  – Incorporate macro and top-down themes

• Available for the first time fully integrated within Thomson ONE
  – Also available standalone, as a datafeed, and coming soon to QA Studio
Our model predicts quant factor returns on a month ahead basis based on regressing predictors over 1998-2003 (and then holding constant).

- We “train” the linear regression over a complete market cycle in the US.

- Separately we have seen that during quantitative bull markets (2003-2007) all quant factors generate positive returns and gains from factor timing are small.
Factor timing model significantly outperforms baseline (equal weighting) since 2008 when most quant signals have struggled.
Static optimization of weights doesn’t do as well, although it beats equal weighting.
Our dynamic factor model correctly reweighted factors during the great recession by emphasizing profitability and de-emphasizing leverage.
Thomson Reuters Datastream, fundamental data, and tick analysis engine Velocity Analytics can be used in a framework to dynamically weight alpha factors.

- Model the equity risk premium with as-published macroeconomic variables from Datastream
- Look at investor sentiment component based on high-frequency pricing data from Velocity Analytics
- Use a simple linear regression model to establish relationships between macro variables and a complete set of individual quant factors
- Train over a complete business cycle
- Future work on extension to non-US markets and looking at various weighting schemes
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QA STUDIO

QA Studio is the next-generation tool for quantitative research, combining a global, normalized database with powerful analytics powered by Palantir.
WHAT MAKES QA STUDIO UNIQUE?

1. **POWERFUL ANALYTICS**: Identify alpha-generating insights faster. Powerful analytics and visualization capabilities paired with intuitive access to your data dramatically reduce the time to take your best ideas to market.

2. **FLEXIBILITY**: Utilize the full development platform for building custom functions and streamlined workflows, or use intuitive point-and-click applications to analyze the data.

3. **COLLABORATION**: Powerful collaboration capabilities break down barriers and allow different types of users at a firm to work together.

4. **DATA INTEGRATION**: Benefit from a global, normalized database (QA Direct) with the ability to integrate proprietary and third party data.
We know that quant factors perform differently over different phases of the business cycle.

Long/short return
Select epochs of high volatility:
Regime analysis: ROA, VIX > 38
ROA vs. Debt to Equity with VIX overlay: Profitability wins and leverage gets punished during high volatility periods.
When the Index of Leading Economic Indicators is rising sharply, leverage does well.
EVENT STUDY: Commodities and Energy
Buy US refiners when Brent – WTI spread inverts?
EVENT STUDY: Commodities and Energy
Don’t buy US refiners when Brent is trading at a premium!

Basic statistics:
- Single trades: 30
- Matched trades: 15
- Positions: 1, 0 open
- Starting Capital: $1,000,000.00
- Ending Capital: $423,546.35
- Start date (incl.): 1990-03-05
- End date (incl.): 2011-03-04
- Baseline duration: 7670 days

Against holding cash:
- Net profit: $-576,453.55
- Net profit %: -57.65%
- Annualized return %: -3.99%
- Annualized volatility: 11.17
- Max sys DD: $864,958.95
  (dates): 2001-06-06 to 2009-03-06
- Max sys DD %: 71.85%
  (dates): 2001-06-06 to 2009-03-06
- Recovery factor: -0.67

Buy, Hold 30 days
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Summary: StarMine research shows that a combination model using StarMine’s Analyst Revisions Model and StarMine’s Relative Value model to trade liquid Japanese equities outperforms a simple price momentum strategy.

1. Universe selection – Explorer
2. Factor selection – Strategy
3. Multi-factor combination study – Twiddle
4. Implement the most profitable strategy – Custom Metric
1. **Universe Selection**: liquid Japanese equities

   i. Choose the “Country Filter” to restrict to stocks in Japan

   ii. Choose the “Age of data Filter” to restrict to live stocks
1. **Universe Selection:** liquid Japanese equities

   iii. Choose the “Histogram Filter” to restrict to stocks with greater than $5MMUSD in average daily dollar volume.
2. **Factor Selection: What works in Japan?**

Systematically compare returns from a naïve PriceMo strategy to StarMine’s ARM and RV models.

![Diagram comparing returns]

- **Price Mo**
  - Annualized Return: -5.318%
  - Alpha: 0.1
  - Volatility: 31.8

- **ARM**
  - Annualized Return: 6.426%
  - Alpha: 0.275
  - Volatility: 18.5

- **RV**
  - Annualized Return: 23.09%
  - Alpha: 0.756
  - Volatility: 28.7
3. Multi-factor study:

Given that StarMine ARM and RV work well for our universe of liquid Japanese equities – do they perform better in combination than either does alone?

Yes.

Using Twiddle we can vary the weight for a linear combination of ranks, we find that 80% RV + 20% ARM yields the highest Annualized Returns

e.g. \[ w \times \text{RV} + (1-w) \times \text{ARM}, \ w = 0.8 \]
4. **Implement your most profitable strategy**

i. Save a flexible version of the combo alpha model as “MyComboSignal” using the “Custom Metric” module

```
return w * (TimeSeries)apply(m1, this) + (1 - w) * (TimeSeries)apply(m2, this);
```

ii. Use MyComboSignal to rank the stocks in my universe ‘today’ – select top bucket as my ‘buy list’, bottom bucket as my ‘sell list’
Top Decile of MyComboSignal as of 10/22/2010: 38 Stocks to buy

Top 5 BUYS:
1. JVC
2. NIPPON YUSEN
3. SEGA SAMMY HLDG
4. KAYABA
5. PIONEER

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Timesamp of Close</th>
<th>Past Year close on or before 10/2010-10-22</th>
<th>dollarVolume</th>
<th>average</th>
</tr>
</thead>
<tbody>
<tr>
<td>JVC KENWOOD HOLDINGS</td>
<td>JVCX1</td>
<td>Friday, October 22, 2010</td>
<td>281.35 JPY/share</td>
<td>6.087 M USD</td>
<td>8.19</td>
</tr>
<tr>
<td>NIPPON YUSEN KK</td>
<td>NIPP158</td>
<td>Friday, October 22, 2010</td>
<td>332 JPY/share</td>
<td>55.88 M USD</td>
<td>8.94</td>
</tr>
<tr>
<td>SEGA SAMMY HLDG</td>
<td>SGLP51</td>
<td>Friday, October 22, 2010</td>
<td>1.035 JPY/share</td>
<td>20.66 M USD</td>
<td>1.92</td>
</tr>
<tr>
<td>KAYABA INDUSTRY</td>
<td>KAYA1</td>
<td>Friday, October 22, 2010</td>
<td>469 JPY/share</td>
<td>8.06 M USD</td>
<td>4.38</td>
</tr>
<tr>
<td>PIONEER</td>
<td>PIONE17</td>
<td>Friday, October 22, 2010</td>
<td>289 JPY/share</td>
<td>17.91 M USD</td>
<td>2.82</td>
</tr>
<tr>
<td>SHOYA SHEET GLASS</td>
<td>SHOWA17</td>
<td>Friday, October 22, 2010</td>
<td>672 JPY/share</td>
<td>10.47 M USD</td>
<td>1.33</td>
</tr>
<tr>
<td>NIPPON SHEET GLASS</td>
<td>NIPP120</td>
<td>Friday, October 22, 2010</td>
<td>174 JPY/share</td>
<td>43.81 M USD</td>
<td>6.78</td>
</tr>
<tr>
<td>LINTEC</td>
<td>LINTC2</td>
<td>Friday, October 22, 2010</td>
<td>1,856 JPY/share</td>
<td>1.68 M USD</td>
<td>1.78</td>
</tr>
<tr>
<td>TOKUYAMA</td>
<td>TOKY2</td>
<td>Friday, October 22, 2010</td>
<td>454 JPY/share</td>
<td>23.64 M USD</td>
<td>5.23</td>
</tr>
<tr>
<td>KAWASAKI KIEN KAISHA</td>
<td>KAWA54</td>
<td>Friday, October 22, 2010</td>
<td>315 JPY/share</td>
<td>41.62 M USD</td>
<td>1.29</td>
</tr>
<tr>
<td>ASAI SEIKI</td>
<td>ASAI19</td>
<td>Friday, October 22, 2010</td>
<td>2,531 JPY/share</td>
<td>31.24 M USD</td>
<td>1.03</td>
</tr>
<tr>
<td>ASAHI KASEI</td>
<td>ASAIH19</td>
<td>Friday, October 22, 2010</td>
<td>483 JPY/share</td>
<td>24.93 M USD</td>
<td>0.93</td>
</tr>
<tr>
<td>NIPPON SHOKUBAI</td>
<td>NIPPS49</td>
<td>Friday, October 22, 2010</td>
<td>780 JPY/share</td>
<td>15.42 M USD</td>
<td>1.93</td>
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<tr>
<td>NGK SPARK PLUG</td>
<td>NGK5SP</td>
<td>Friday, October 22, 2010</td>
<td>1,123 JPY/share</td>
<td>3.03 M USD</td>
<td>0.93</td>
</tr>
<tr>
<td>YAMAHA MOTOR</td>
<td>YAMAHA4</td>
<td>Friday, October 22, 2010</td>
<td>1,216 JPY/share</td>
<td>24.09 M USD</td>
<td>1.93</td>
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<tr>
<td>MITSUBISHI MATERIALS</td>
<td>MITSU373</td>
<td>Friday, October 22, 2010</td>
<td>257 JPY/share</td>
<td>20.61 M USD</td>
<td>0.82</td>
</tr>
<tr>
<td>COCCACOLA WEST</td>
<td>COCA27</td>
<td>Friday, October 22, 2010</td>
<td>1,267 JPY/share</td>
<td>5.61 M USD</td>
<td>0.43</td>
</tr>
<tr>
<td>SEIKO EPSON</td>
<td>SEIK05</td>
<td>Friday, October 22, 2010</td>
<td>1,149 JPY/share</td>
<td>19.94 M USD</td>
<td>1.78</td>
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<tr>
<td>TOYOTA TSUSHO</td>
<td>TOYOT14</td>
<td>Friday, October 22, 2010</td>
<td>1,291 JPY/share</td>
<td>22.86 M USD</td>
<td>1.85</td>
</tr>
<tr>
<td>NX</td>
<td>NIX203</td>
<td>Friday, October 22, 2010</td>
<td>1,147 JPY/share</td>
<td>11.74 M USD</td>
<td>1.03</td>
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<tr>
<td>MITSU</td>
<td>MITSU682</td>
<td>Friday, October 22, 2010</td>
<td>1,281 JPY/share</td>
<td>177.5 M USD</td>
<td>0.82</td>
</tr>
<tr>
<td>YOKOHAMA RUBBER</td>
<td>YOKOH8</td>
<td>Friday, October 22, 2010</td>
<td>496 JPY/share</td>
<td>7.45 M USD</td>
<td>0.43</td>
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<tr>
<td>RINGO</td>
<td>RING02</td>
<td>Friday, October 22, 2010</td>
<td>522 JPY/share</td>
<td>6.16 M USD</td>
<td>1.19</td>
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<tr>
<td>YAMATANE</td>
<td>YAMAT10</td>
<td>Friday, October 22, 2010</td>
<td>2,012 JPY/share</td>
<td>5.83 M USD</td>
<td>2.93</td>
</tr>
<tr>
<td>TOTAI CARBON</td>
<td>TOTAI17</td>
<td>Friday, October 22, 2010</td>
<td>486 JPY/share</td>
<td>11.31 M USD</td>
<td>0.43</td>
</tr>
<tr>
<td>APS ELECTRIC</td>
<td>APSL12</td>
<td>Friday, October 22, 2010</td>
<td>771 JPY/share</td>
<td>28.14 M USD</td>
<td>0.82</td>
</tr>
<tr>
<td>DAIKIN SCREEN MFGG</td>
<td>DAI1214</td>
<td>Friday, October 22, 2010</td>
<td>490 JPY/share</td>
<td>29.94 M USD</td>
<td>0.82</td>
</tr>
<tr>
<td>TOYOTA IND.</td>
<td>TOYOR13</td>
<td>Friday, October 22, 2010</td>
<td>11,740 JPY/share</td>
<td>55.88 M USD</td>
<td>4.86</td>
</tr>
<tr>
<td>TORAY IND.</td>
<td>TORYR7</td>
<td>Friday, October 22, 2010</td>
<td>466 JPY/share</td>
<td>7.94 M USD</td>
<td>0.82</td>
</tr>
<tr>
<td>MARU GROUP</td>
<td>MARU3</td>
<td>Friday, October 22, 2010</td>
<td>648 JPY/share</td>
<td>11.30 M USD</td>
<td>1.85</td>
</tr>
<tr>
<td>DAIWA HOUSE INDUSTRY</td>
<td>DAHI17</td>
<td>Friday, October 22, 2010</td>
<td>899 JPY/share</td>
<td>23.83 M USD</td>
<td>1.85</td>
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<tr>
<td>ZEON</td>
<td>ZOIC12</td>
<td>Friday, October 22, 2010</td>
<td>685 JPY/share</td>
<td>25.67 M USD</td>
<td>0.82</td>
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<tr>
<td>IDEMA KOSAN</td>
<td>IDEMI2</td>
<td>Friday, October 22, 2010</td>
<td>6,830 JPY/share</td>
<td>11.17 M USD</td>
<td>0.82</td>
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<tr>
<td>DENGU</td>
<td>DENG03</td>
<td>Friday, October 22, 2010</td>
<td>2,541 JPY/share</td>
<td>72.02 M USD</td>
<td>2.82</td>
</tr>
<tr>
<td>DAIKIN SCREEN MFG</td>
<td>DAI1210</td>
<td>Friday, October 22, 2010</td>
<td>8,520 JPY/share</td>
<td>62.23 M USD</td>
<td>7.54</td>
</tr>
<tr>
<td>NIPPON LIGHT METAL</td>
<td>NIPP105</td>
<td>Friday, October 22, 2010</td>
<td>145 JPY/share</td>
<td>10.18 M USD</td>
<td>0.82</td>
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<tr>
<td>ADVANCE MOTOR</td>
<td>ADVA5</td>
<td>Friday, October 22, 2010</td>
<td>1,089 JPY/share</td>
<td>20.07 M USD</td>
<td>1.85</td>
</tr>
<tr>
<td>YAMAHA</td>
<td>YAHAMH1</td>
<td>Friday, October 22, 2010</td>
<td>1,003 JPY/share</td>
<td>10.82 M USD</td>
<td>1.85</td>
</tr>
</tbody>
</table>
**Bottom Decile of MyComboSignal as of 10/22/2010: 39 Stocks to sell**

**Top 5 SELLS:**

1. TREND MICRO
2. NINTENDO
3. ORACLE JAPAN
4. FAST RETAILING
5. PIGEON
Why long SEGA and short Nintendo?

We can instantly pull up the price charts, and daily ARM scores for these two stocks and see that analyst sentiment diverged sharply in May of 2010.

From here we could go deeper and look into fundamentals, news etc. – generating insight from our quant study!
How did the earthquake/tsunami affect what is working in Japan?

![StarMine Model Performance in Japan on Large-Cap Stocks](chart.png)

- **StarMine Model Performance in Japan on Large-Cap Stocks**
- **Pre- and Post-Tsunami**
  - **Pre-Tsunami**: T12M as of Feb 2011
  - **Post-Tsunami**: Last 3M (Annualized)

**StarMine Model**
- ARM
- EQ
- IV
- RV
- PriceMo
- ValMo

**Annualized Performance**
- Pre-Tsunami: T12M as of Feb 2011
- Post-Tsunami: Last 3M (Annualized)
How did the earthquake/tsunami affect what is working in Japan? Earnings Quality wins.

StarMine Model Performance in Japan on Large-Cap Stocks
Pre- and Post-Tsunami

Pre-Tsunami: T12M as of Feb 2011
Post-Tsunami: Last 3M (Annualized)

Annualized Performance:
- ARM
- EQ
- IV
- RV
- PriceMo
- ValMo

Pre-Tsunami: T12M as of Feb 2011
Post-Tsunami: Last 3M (Annualized)
Earnings Quality had a similar rally in the US during the financial crisis of 2008.
QUESTIONS?

To request a copy of these slides, go to:
http://online.thomsonreuters.com/forms/imdownloads/