NIS Avoiding Torpedoes Narrative

How to detect and avoid outlier events in risk controlled portfolios.

Introduction:
Blow-ups can be prohibitively expensive in risk-controlled portfolios. Managers who are particularly benchmark sensitive can easily see a years worth of work wiped out if two bets go the wrong way. To avoid this problem, sell the stocks that blow-up just before they blow-up, or have a process in place that precludes their purchase.

To illustrate this point I constructed a generic risk controlled portfolio through which the impact of a few blow-ups will be reviewed. Implementation can be quantitative, fundamental or both, each adding to performance differently. Finally, I will demonstrate that real-time results of the model support the backtesting results.

Section 1:
Our generic portfolio of 100 stocks with low tracking error, low 'market' or 'common' factor exposures, low sector and industry bets and low active positions has a tracking error of 1.5% and is quite diversified according to modern portfolio theory. To illustrate the impact on performance of 'blow-ups' I am assuming a high but not unrealistic information ratio of 1.

During the third quarter of 2000 when this analysis was completed there were several high profile 'blow-ups'. This is not a comprehensive sample; it is intended to be illustrative only. Each of the stocks listed, Computer Associates, BMC Software, Lexmark, Xerox, Alcoa, Kodak, Polaroid, and The Gap, all were down significantly during the quarter. Each of these stocks if over-weighted at the average active weight of 0.30% would have cost 79 basis points; half of your expected alpha.

Section 2:
Predicting these stocks. We look at several factors:
> 1)   Valuation, expensive stocks blow up as often as cheap stocks but much more violently.
> 2)   Revisions, companies can hide financial problems as they manipulate earnings.
> 3)   History, stocks that have blown up in the past are more likely to blow-up in the future.
> 4)   Balance sheet trends, aggressive accounting policies eventually catch up to the companies manipulating earnings.

Section 3:

Our backtesting focused on the Russell 3000 index, as it existed historically through the testing period of 1994 – 1999. For inclusion in the sample, a company must have at least 2 years of continuous financial data. We use historical data as it became available and still allowed for a lag of 30 and 60 days to allow for look-ahead bias. Finally we compound total returns, but add specific returns. We also tested on individual sectors and found that the model showed efficacy across all sectors with no statistically significant bias to one particular sector. The correlations of the model to 'market' factors are also quite low.

The model tests quite well on all the metrics we used. Perhaps most importantly, the average correlation to the Barra 'Common' Factors is 4.69% and to the Northfield factors is 6.55%. The average correlation of a valuation model is 33.15% and of a revision model 20.04%. This implies that the model can be introduced in stock specific space with little impact to the risk-controlled portfolio.

Section 4:

Finally, the model performs well in real time. It's one thing to see a model test well, it's quite another to see it work well. Of the sample mentioned at the beginning of the presentation, the model correctly specified 6 of the 8 blow-ups and performed well on a quintile and decile spread basis.

The model can be implemented in any of a number of ways:

Quantitative, N(0,1) as a supplement to your alpha forecast.

Fundamental, interaction with analysts and company managements

Both quantitative and fundamental, N(0,1) as a supplement to your alpha forecast and through interaction with analysts and company managements

In conclusion, stocks that 'blow-up' can be extremely costly to performance in risk controlled portfolios. They can be predicted and avoided using quantitative techniques and enhanced adding fundamental research to the discipline. Once the portfolio is adjusted to account for these events expected performance improves dramatically.
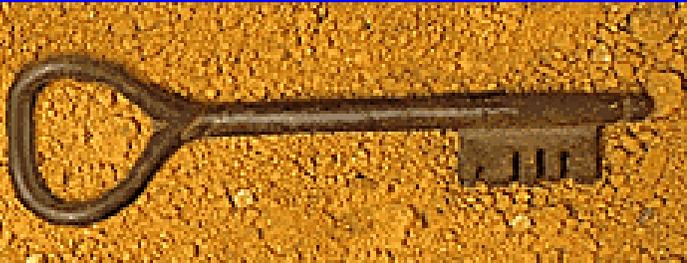
Avoiding Torpedoes

How to avoid outlier events in risk controlled portfolios

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Sell Stocks Likely to 'Blow-Up'

- ◆ Discuss impact of 'blow-ups'
- ◆ Discuss model predictive of 'blow-ups'
- ◆ Test model for predictive ability
- ◆ Review implementation strategies

Hypothetical Portfolio

- Predicted Tracking Error to S&P — 1.5%
  - ◆
- Expected Alpha — 1.5%
  - ◆
- Expected Information Ratio — 1.0
  - ◆
- Number of stocks — 100
  - ◆
- Average Active Bet — 0.3%
  - ◆
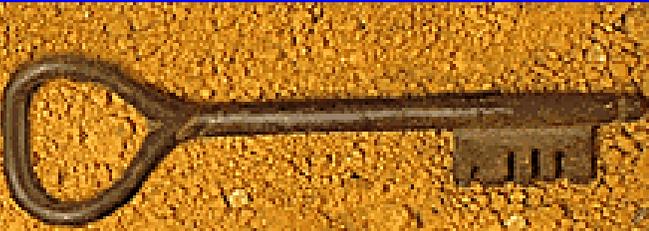
Some Recent 'Blow-Ups'

Reviewed during the September Quarter of 2000

- ◆ Computer Associates   -50.8% Abs   -49.8% Rel
- ◆ BMC Software   -47.6% Abs   -46.6% Rel
- ◆ Lexmark   -44.2% Abs   -43.3% Rel
- ◆ Xerox   -27.4% Abs   -26.4% Rel
- ◆ Alcoa   -12.7% Abs   -11.7% Rel
- ◆ Eastman Kodak   -31.3% Abs   -30.3% Rel
- ◆ Polaroid Corp.   -25.6% Abs   -24.6% Rel
- ◆ Gap Stores   -35.6% Abs   -34.6% Rel
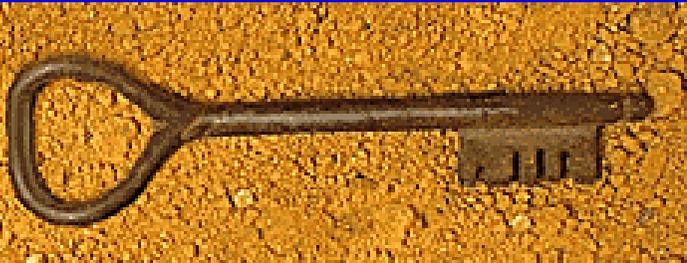
Impact to Portfolio

- ◆ Assuming an average over-weight of 0.3%
- ◆ The previously mentioned stocks would have cost ~79 basis points, half of your expected alpha
- ◆ To have under-weighted them by 0.3% would have added ~79 basis points to performance
- ◆ Getting these 8 stocks right could cause a 158 basis point swing

Predicting 'blow-ups'

- Model based on
  - Valuation
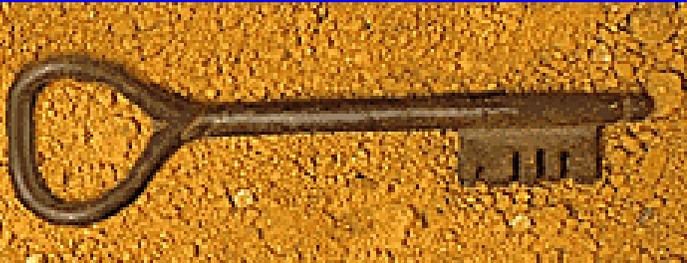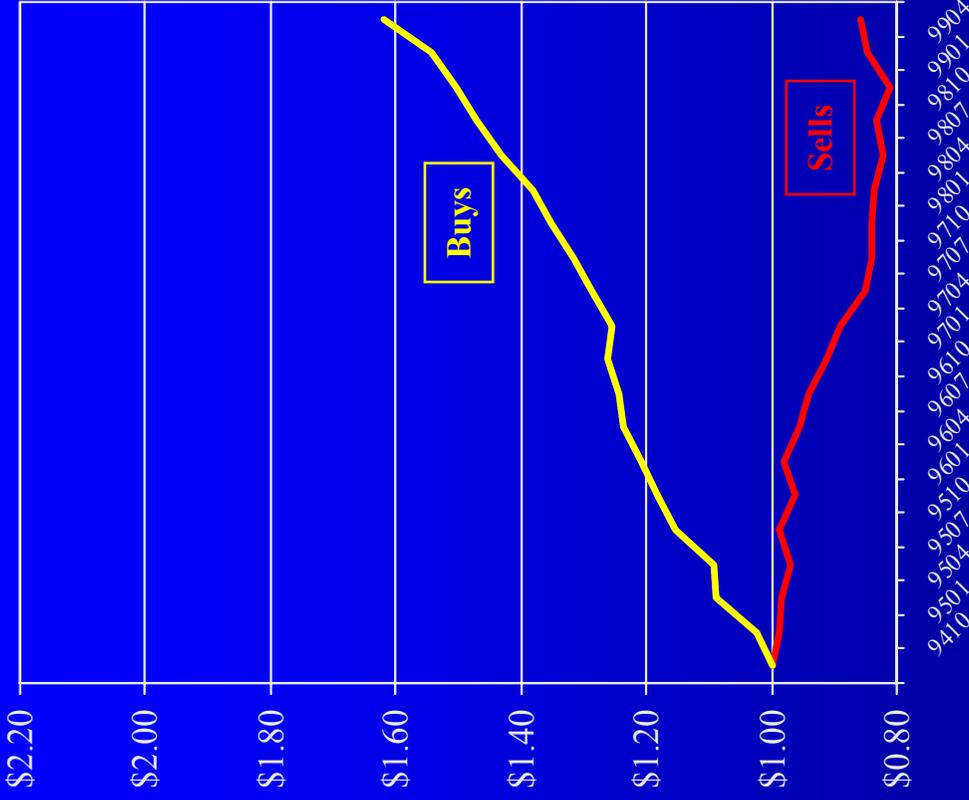 - Revisions
  - Company history
  - Balance Sheet Trends
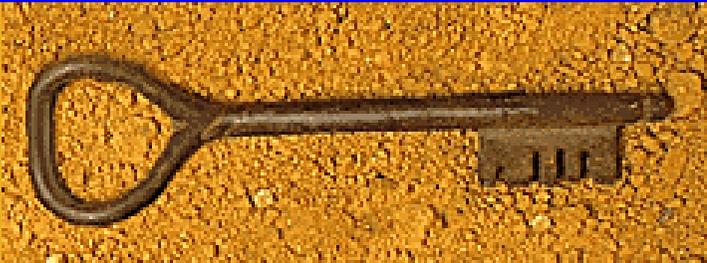
Backtesting Methodology

◆ **Universe:**
- Russell 3000®

◆ **Data Requirements:**
- 2 Years of continuous financial data

◆ **Look Ahead Bias:**
- Tested 30 and 60 day lags
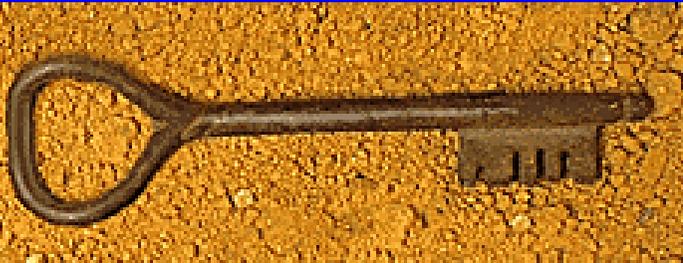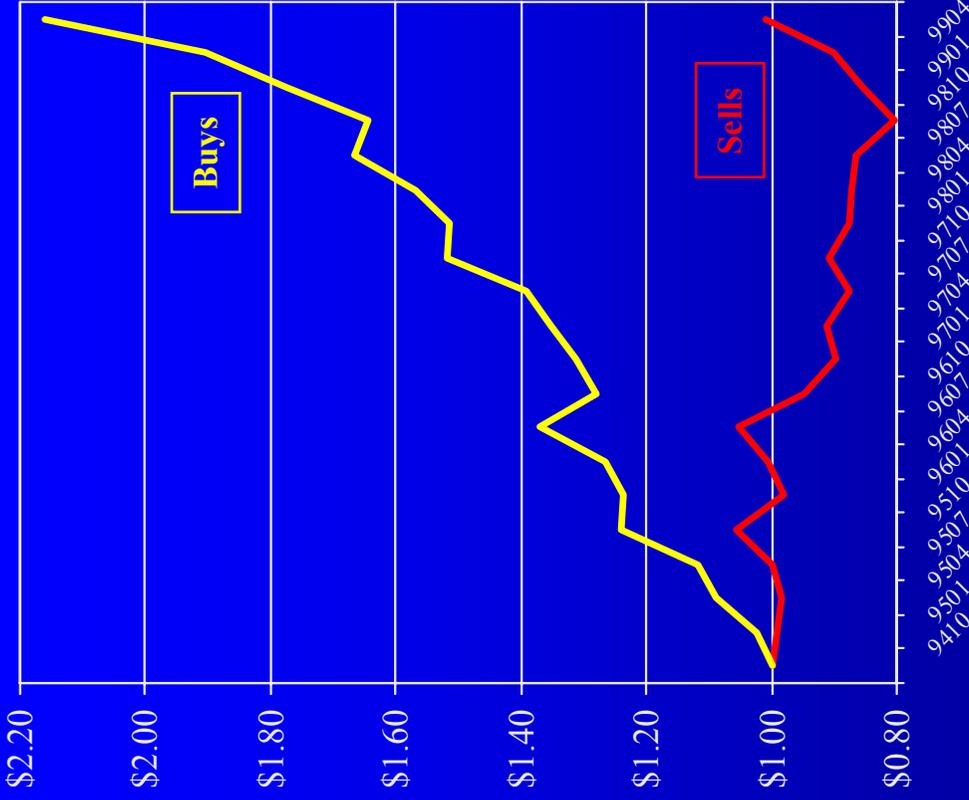
Rank Backtesting Information

(Decile Specific Returns)

- ◆ Chart Represents additive growth of $1
- ◆ Sharpe Ratio 2.0
- ◆ Rank IC 0.084

Buys

Sells

$2.20
$2.00
$1.80
$1.60
$1.40
$1.20
$1.00
$0.80

9410 9501 9504 9507 9510 9601 9604 9607 9610 9701 9704 9707 9710 9801 9804 9807 9810 9901 9904

Rank Backtesting Information

(Decile Total Returns)

- ◆ Chart Represents growth of $1

- ◆ Sharpe Ratio   1.78

- ◆ Rank IC   0.088

Buys

Sells

$2.20
$2.00
$1.80
$1.60
$1.40
$1.20
$1.00
$0.80

9410 9501 9504 9507 9510 9601 9604 9607 9610 9701 9704 9707 9710 9801 9804 9807 9810 9901 9904
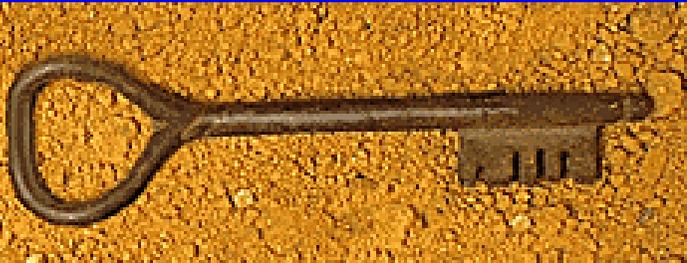
Correlations

- ◆ The Chart represents the average of the absolute value of the correlations to the 13 Barra common factors and the 12 Northfield factors*

- ◆ Correlations to revision and valuation models are much higher

Chart (horizontal bar, percentage axis 0% to 100%):

Category	Value
Barra Mean Absolute Correlation	4.69%
Northfield Mean Absolute Correlation*	6.55%
Valuation Model (Barra)	33.15%
Est. Rev. Model (Barra)	20.04%
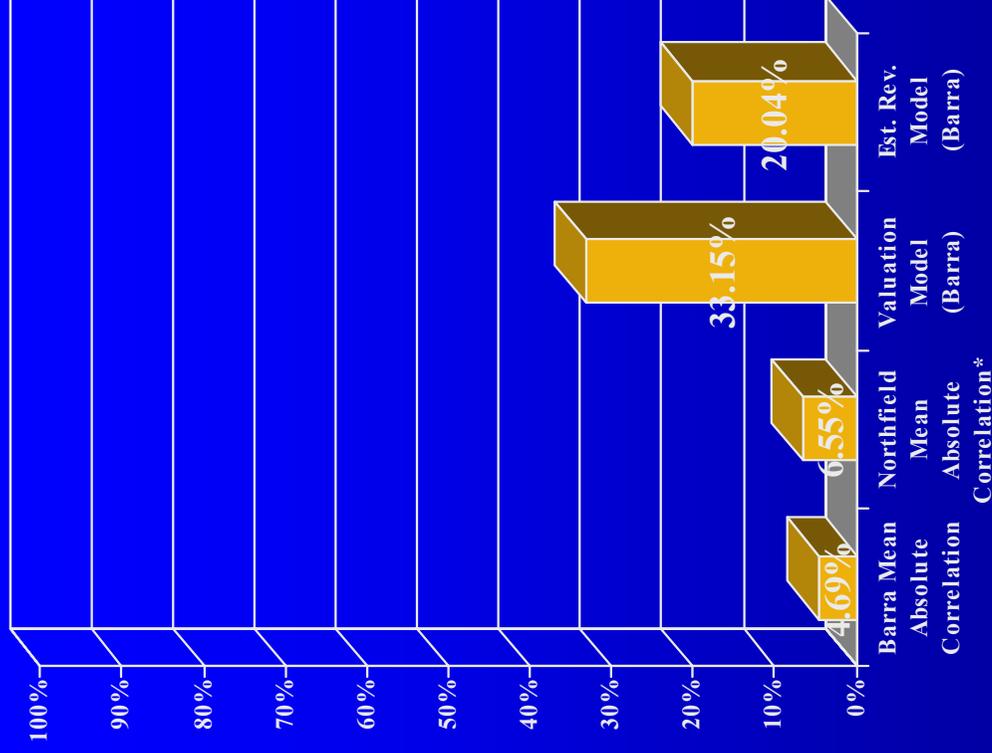
* The correlation of the Northfield factors to the model score are as of August 2000, not the full time series of the test.

Implementation

- ◆ Quantitative
  - – Supplement alpha forecast
- ◆ Fundamental
  - – Tool for analysts to review key metrics
- ◆ Both
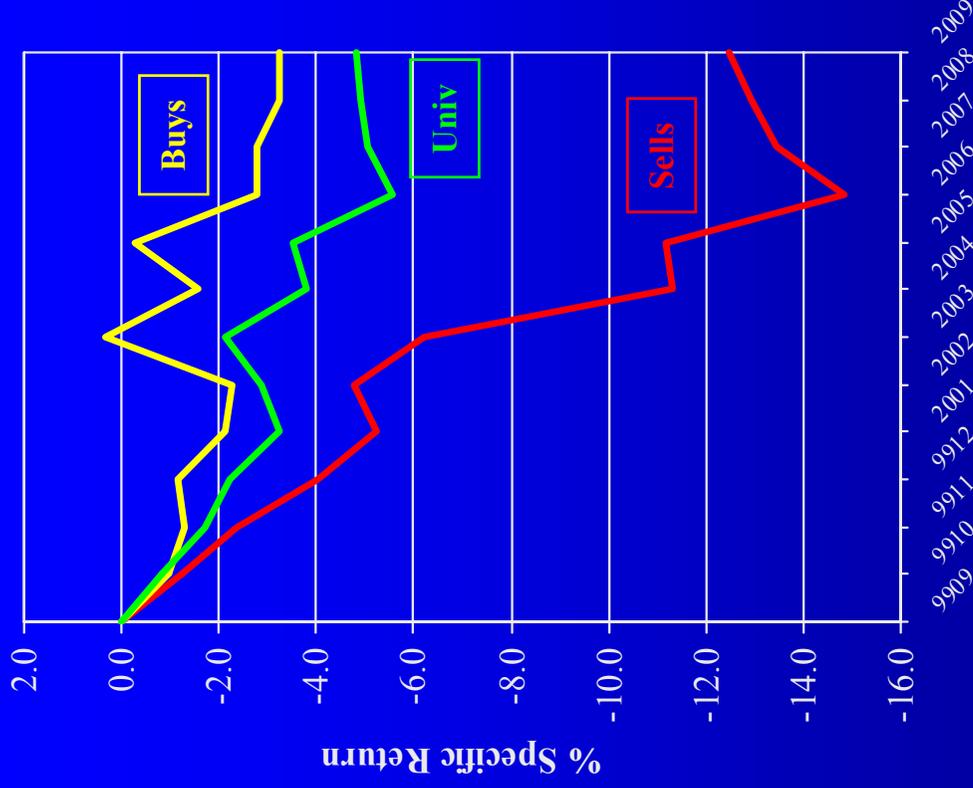 - – Quantitative and Fundamental

Implement quantitatively

- ◆ As illustrated earlier, correlations to common factors are quite low so implementation in stock specific space is possible
- ◆ Adding model score to discipline will have minimal impact on tracking risk

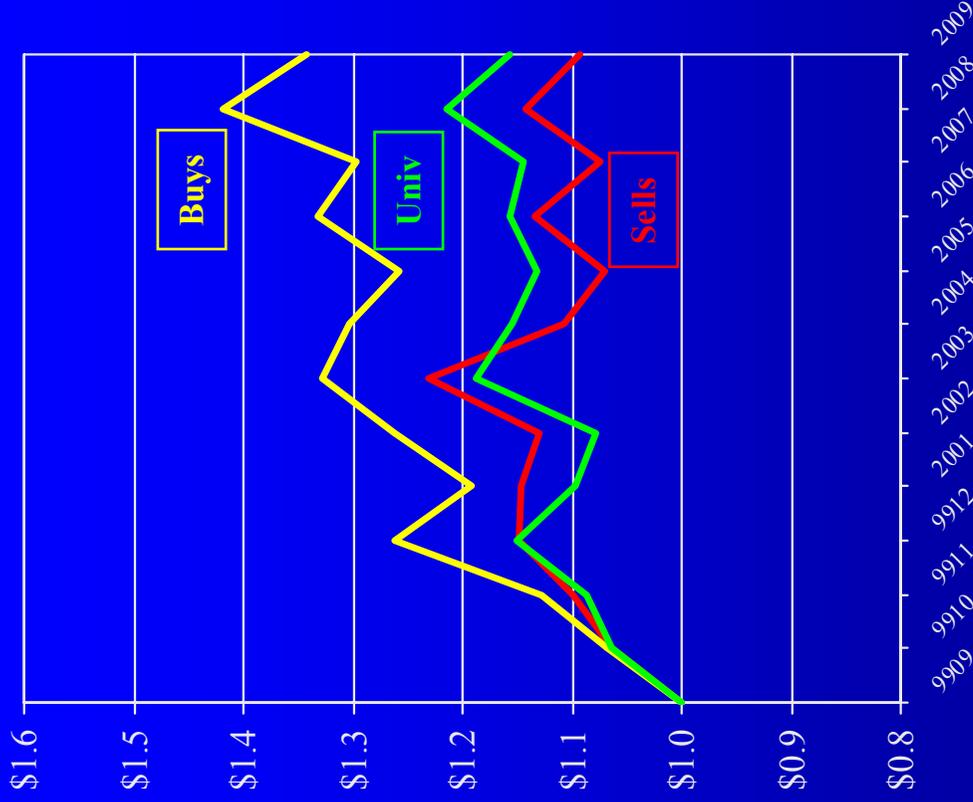# Real Time Results

(Specific Return)

- ◆ Chart Additive Specific Returns

- ◆ Sharpe Ratio   2.30

- ◆ Information Ratio   2.55

- ◆ Positive Months 9 / 11

Real Time Results

(Total Return)

- Chart Represents growth of $1
- Sharpe Ratio   2.30
- Information Ratio   2.55
- Positive Months 7 / 11

Improvements to performance

- Quantitative
  - ◆ Specific Return Value Added
    - Top – Bottom Quintile   9.25%
  - ◆ Total Return Value Added
    - Top – Bottom Quintile   24.9%

Implement fundamentally

- Review stocks that show up with problems
- Discuss the models with the analysts
- Discuss the models with the CFO
- If all checks out use the other models or portfolio manager inputs to determine the weight in the portfolio
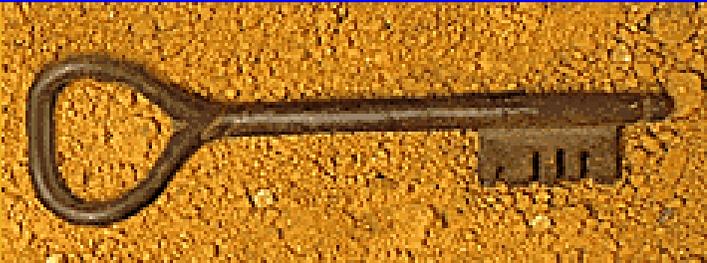
Real Time Results*

Reviewed during the third quarter of 2000

◆ Computer Associates — Predicted

◆ BMC Software — Predicted

◆ Lexmark — Predicted

◆ Xerox — Predicted

◆ Alcoa — Predicted

◆ Eastman Kodak — Missed

◆ Polaroid Corp. — Missed

◆ Gap Stores — Predicted

*Not meant to be representative of a sample. Simply meant to be representative of how the model fails and succeeds.
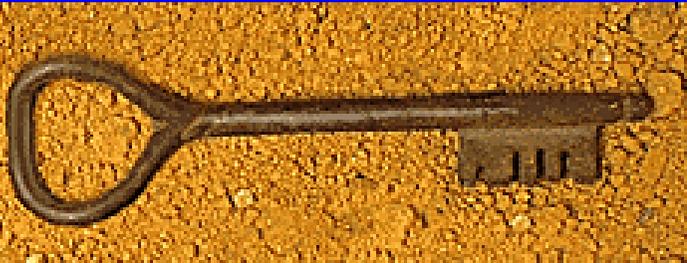
Improvements to performance

- ◆ Fundamental
- ◆ To have accurately predicted 6 of the 8 profiled stocks would add 0.47% to your return during the third quarter
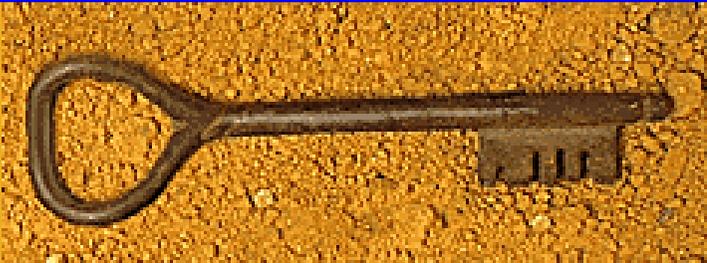
Summary

- Dramatic events in stock specific space can drastically affect your performance

- Your ability to predict these events is improved

- Performance can be improved substantially by predicting these outlier events