Northfield's Model Blending Technology

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Northfield Online Workshop

September 2017

Abstract

- Various vendors provide models with different forecast horizons, normally consisting of short-term, mid-term and long-term models. Each using more or less frequent observation dependent on the forecast horizon: hourly, daily, weekly or monthly and different half-lives to make the model more responsive to recent events for short term investors or longer half-lives for long term investors. As markets change over time, why should investors be limited to a few specific forecast horizons?

- Northfield introduced blending in 2013 with the release of our Adaptive Near Horizon Risk model which instead of relying on more frequent data, incorporates contemporaneous market conditions into the existing model structure. Since the Adaptive Near Horizon Risk models have the same factor structure as our long-term models we can combine the models to create a customized risk forecast horizon between 2-52 weeks depending on the amount cotemporaneous data an investor wants to be represented in their forecast.

- Recently Northfield released the game changing **Risk Systems That Read®**, which we believe to be the biggest step forward in risk modeling for asset management since the creation of the multi-factor risk model in the 1970s. These models are news conditioned versions of our Adaptive Near Horizon Risk models available in equity as well as multi-asset class models.

- Blending combined with the **Risk Systems That Read®** provides investors the ability to incorporate the powerfully accurate risk measurements of news and sentiment into a custom forecast specific to their needs.

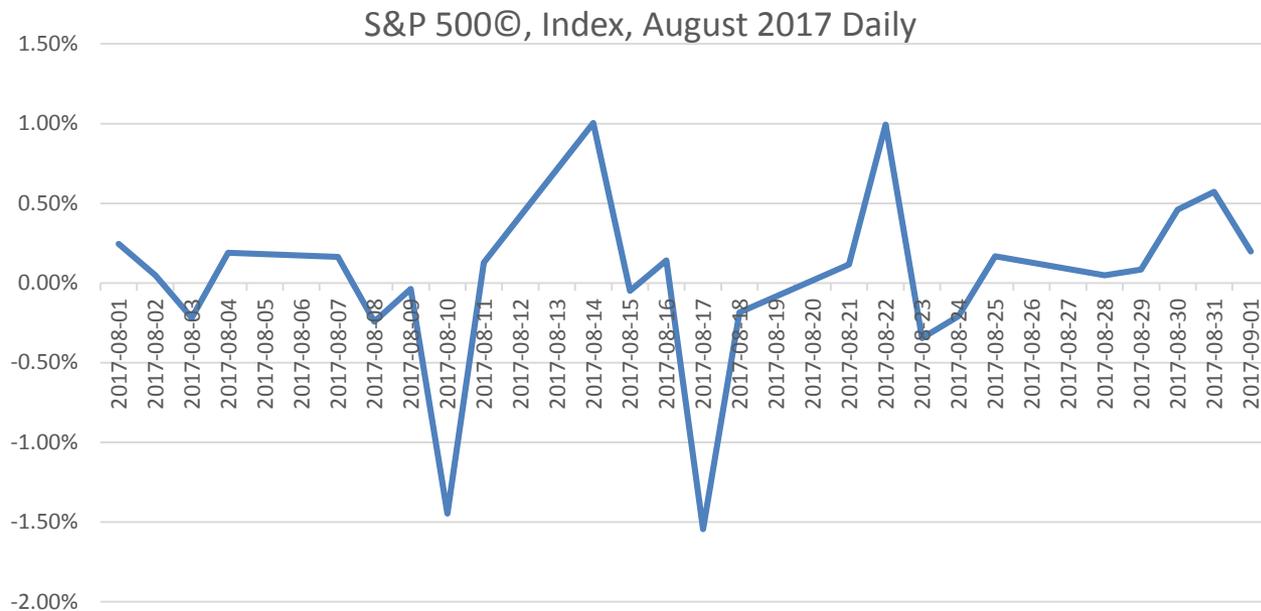**NORTHFIELD** | modeling financial markets worldwide   www.northinfo.com

Overview

1. Why forecast horizons are important?

2. Current options for different horizons.

3. Incorporating contemporaneous information into a risk model.

4. Why blending is useful?

5. How to blend models.

6. Extending beyond forecast horizon blend.

7. Which models can be blended?

8. Summary

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Time Horizons

- Investment horizons are important when determining the use of a risk model.

- Long term models are specifically designed for long term investors.
  - Should never be constructed to respond quickly to market shocks as most shocks are transient, on which long term investors should not make investment decisions.

- A mismatch in the investment horizons can lead to more turnover than necessary to meet the investor's goals.

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Serendipitous Example

On 2017-08-01 the price was 2476.35 one month later on 2017-09-01 the price was 2476.55 with intermonth volatility. Is this risky?

S&P 500©, Index, August 2017 Daily

Source: Federal Reserve Bank of St. Louis, Economic Research Division, Link: https://fred.stlouisfed.org

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Investor's Perspective

- Q: Was August Risky for investors in the S&P?
- A: Depends on your perspective:
  - If you are long term investors this variation in daily returns is just noise. Over the course of the month these daily transient movements cancelled each other out.
    - Following the short term trends would have only cost the long term investor additional trades just to end up where they began.
    - Unnecessarily moving from long term objectives due to noise.
  - If you are short term investor there were risk. Returns moved in the range of 2.5% within days.

How to measure Short Term Risk?

- Most commercially available Short Term Risk models just shorten the time frame or half life.
    - Some with sample periods as short as 60 trading days
- In the March 2017 webinar "Risk, Uncertainty and Time Horizon: What Most Risk Models Get Wrong!" Dan discusses issues with models based on this methodology.
    - *The most common error made in commercial risk models is to try to make models more responsive to day to day events by shortening the historical sample period*

An Alternative Proposition

- Instead of shortening the historical time period or the half life, a more sensible approach is the use of a conditional risk model.
  - *We first estimate risk based on a long sample period, and then adjust the estimates to reflect current information which would say current conditions are different from typical conditions.*
- Webinar slides are available at http://www.northinfo.com/documents/746.pdf.
- Contact Northfield's sales team to access a recording.

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Enter **Risk Systems That Read®**!!

- Northfield introduced a conditional risk model called **Risk Systems That Read®**, which we believe is 'The biggest step forward in risk modelling since the creation of the multi-factor risk model in the 1970's.'

  - Why limit ourselves to time-series methods, when the best information isn't in time series?

  - Instead recondition the entire model covariance matrix to incorporate contemporaneous data.

- What does any of this have to do with Blending?

  - These models are not two distinct time series models (monthly and daily)

  - The conditional risk model is a version of the long term which allows them to be additive.   "Decay" of the contemptuous data.

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Risk Systems That Read® Redux

- ## Presented by Dan diBartolomeo
  - In this presentation, we will cover the text analytics that are now part of model inputs and the framework of how the text analysis is used to condition our factor models for both equities and corporate bonds.
  - The latter half of the presentation will focus on how this model enhancement will contribute to improved portfolio returns by *providing a positive definition of security specific risk.*

- ## Thursday, September 28th
  - 16:00 BST Summer Time (London, GMT+01:00)

- ## For more information and registration
  - http://www.northinfo.com/events.php

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When is blending useful?

- We can all agree markets fluctuate
  - Sometimes markets are riskier than average and sometimes markets are less risky than average.
  - Sometimes news is coming at us quickly and sometimes there is nothing.
  - Sometimes there will be a shift in market and other times there is just noise.

- Current vendor solutions are limited to set horizons- treating each situation the same.
  - Short-term/mid-term/long-term

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Need to customize horizon

- Different reasons why we may want to shorten or lengthen our horizons.
  - Different investments horizons
  - Rebalancing of a long term portfolio
    - Long term investment decision, but short term trades
  - Dramatic change in market conditions
    - More responsive risk model to the market.
    - Strong belief in fundamentals of the portfolio and decide to "weather the storm".
  - Value-at-Risk calculations, and some regulatory regimes such as UCITS3 rules in Europe

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Blending Functionality

Risk Model: EE ▾ Annual ▾ 8/31/2017 ▾

Horizon Blending Percent 20.00 ☐ Use monthly near horizon files only

- Within the current release of the Northfield Optimizer as well as State Street TruView, users can choose to blend the horizon percentage:
  - 0% corresponding to the Long Term annual (52 week) model only
  - 100% corresponding to the Near Horizon **Risk Systems That Read®** (2 week) model only
  - Or anything in-between 11% or 67.4% or I can set horizons such as 4. 5 weeks or 8 months
  - Multiple analysis under different horizons for the same portfolio: 2 week, 6 months, and 1 year.

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Creating A Custom Horizon

- Since the model is conditioned upon itself, users can customize the forecast horizon with some basic math:

- Let:
  - F = (k × k) covariance matrix
  - σ^2 = (length n) stock specific variances
  - c = (scalar) percentage of short horizon

$$(1)\ F_{blended} = c * F_{near\ horizon} + (1\text{-}c)\ F_{annual}$$
$$(2)\ \sigma^2_{\ blended} = c * \sigma^2_{\ near\ horizon} + (1\text{-}c)\ \sigma^2_{\ annual}$$

- User can now decided how reactive the model is to the current conditions.

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# Blending a custom horizon
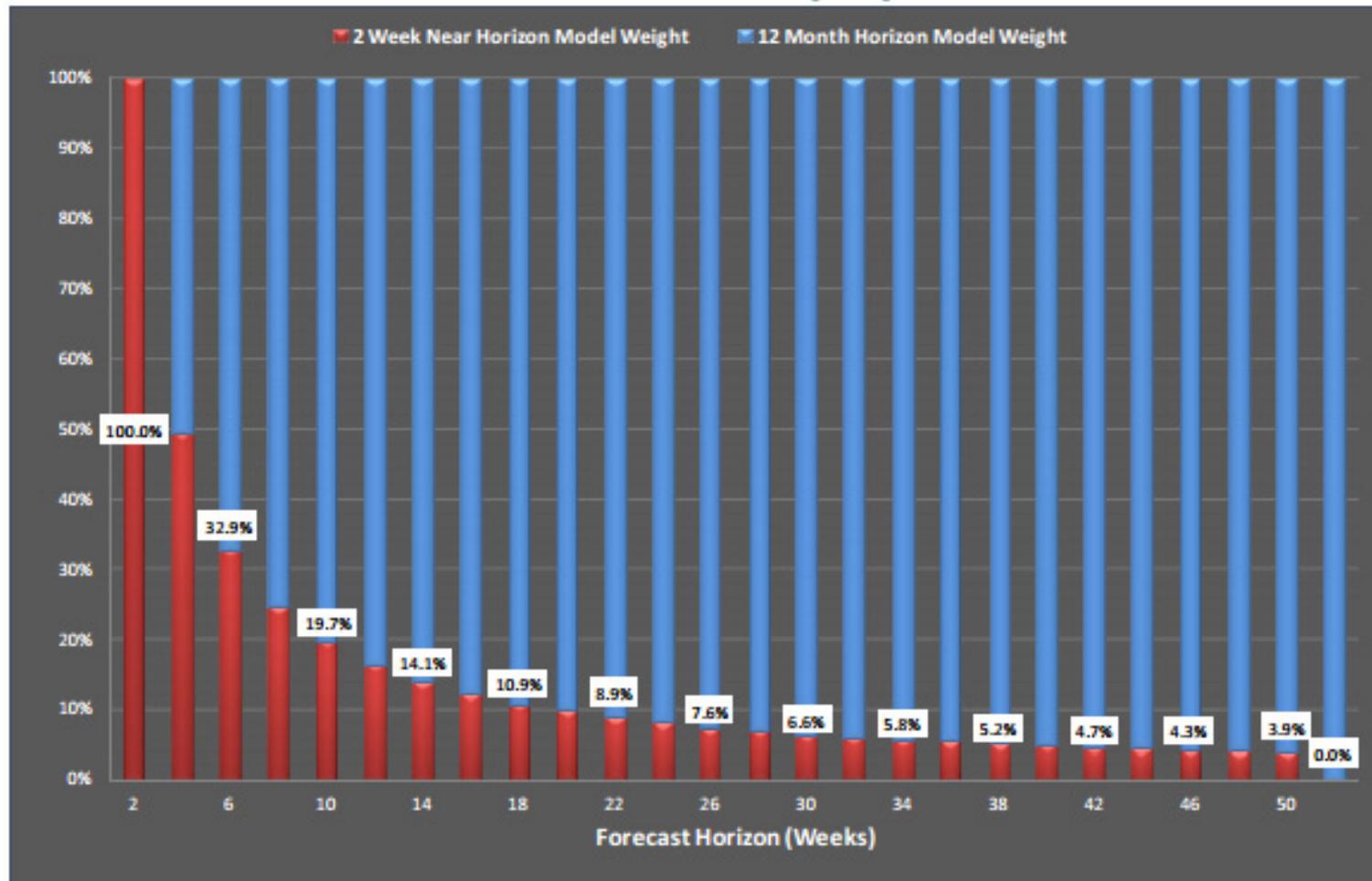
Blending a Volatility Forward

- Blending can be used to construct a "forward volatility curve estimate" starting from today and another period in the future.

With some quick math:

- Let:
  - N = annualized near horizon volatility forecast (100% weight for 2 weeks risk forecast)
  - A = annual volatility forecast (100% weight for 1 year risk forecast)
  - F = forward forecast of 50 week risk starting 2 weeks from now

- Solve for F:

  $A^2 = 2/52 * N^2 + 50/52 * F^2$

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Forward Risk Curve
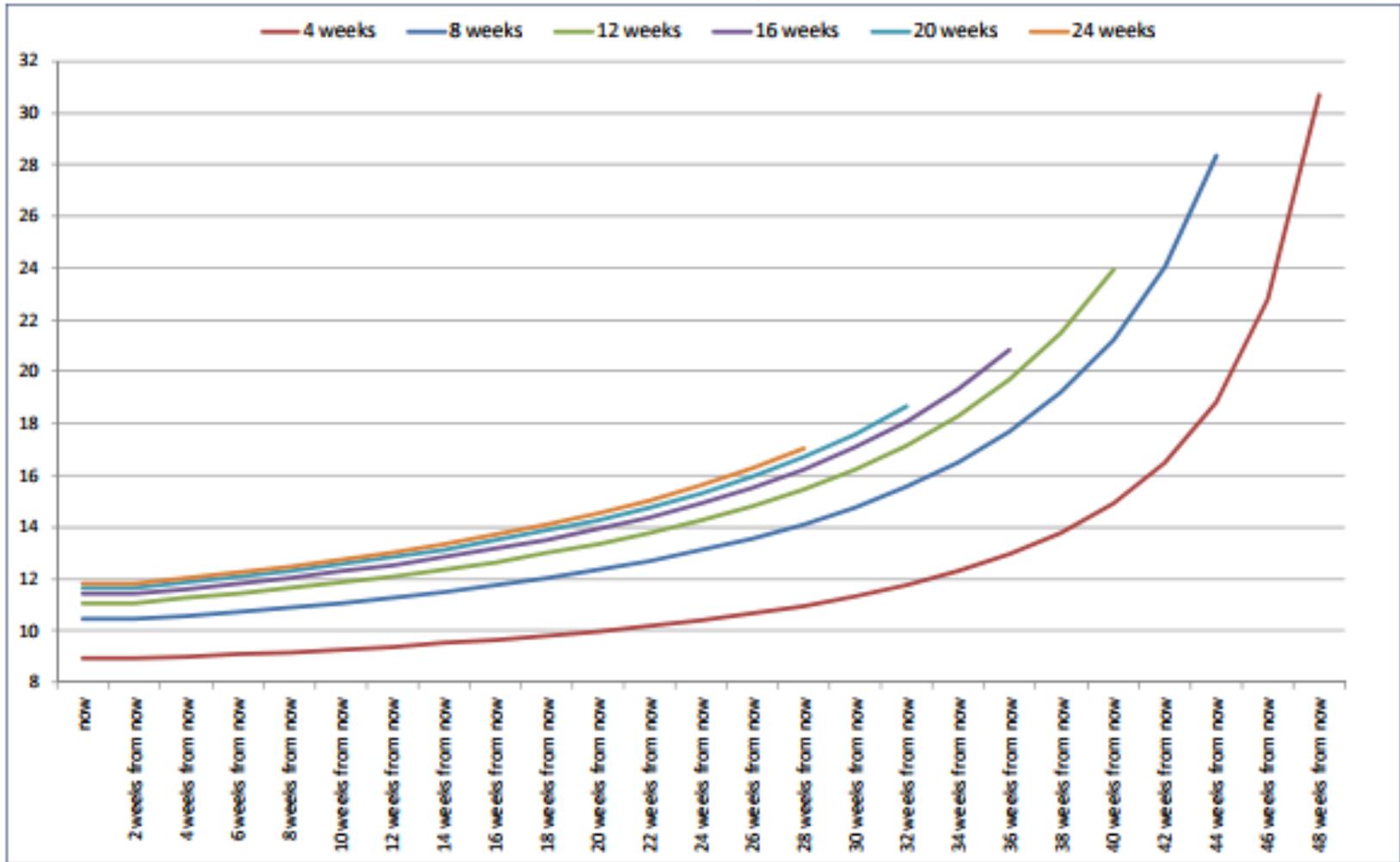
Blending Northfield Models

- ALL "traditional" Northfield models have an Adaptive Near Horizon version which can be blended:
  - Single country and regional equity models
    - Asia Pacific, Australia, Brazil, Canada, China, Europe, Japan, South Africa, Switzerland, United Kingdom and United States
  - Global equity
  - Including multi-asset class model EE with fixed income!!!
- Our research has found a blend of 10-30% improves the predictability of the long term models.
  - User decides how much contemptuous data to incorporate

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More Information

- A few great Technical Support Tips in our Newsletter:
  - March 2013 Newsletter article "Technical Support Tip: Horizon Blending" By Steve Dyer, available at http://www.northinfo.com/documents/546.pdf.
  - September 2013 Newsletter article "Technical Support Tip: Horizon Blending – Using the Horizon Blending Feature" By James Williams, available at http://www.northinfo.com/documents/557.pdf.

- For demonstrations contact your friendly neighborhood sales/support contact.
  - http://www.northinfo.com/contact.php

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We love to talk about this stuff!

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Conclusion

- Blending provides an innovative approach for customizing a user's forecast horizon.

- Changing the proposition of contemporaneous data used in the blend allows for more or less use of reactive model information.

- Blending can be done on the fly with multiple flexible horizons to provide a comprehensive view of any portfolio.
    - Not fixed or limited to a certain horizon