June 2015

Northfield News

A Newsletter for the Friends and Clients of Northfield

Risk Systems That Read

By Dan diBartolomeo

After a series of research projects going back to 1997, Northfield is about to commercially introduce risk models augmented with quantified news flows for investors. News conditioned versions of our "near horizon" models will be available to Northfield clients starting in July. *We believe this will be the biggest step forward in risk modeling for asset management since the creation of the multi-factor risk model in the 1970s.*

News and Conditional Risk Models

Almost all available risk models are "unconditional." They are based on a sample of past history that is deemed relevant, possibly giving more weight to recent observations, or assuming a simple trend in volatility (e.g. GARCH). We recently surveyed industry practice and found models based on sample periods ranging from as short as sixty trading days to more than twenty years. Once the sample period is determined, the *heroic assumption is made that the future will be like the past.*

This process omits everything we know about the present, and how the present is different from the past average conditions of the sample period. Using the information about the present to adjust the risk estimates has been standard in some Northfield models since 1997 and in all models since 2009.

For our purposes, "News" is the set of information coming to investors that tell us how the present is different from the past. This definition implies that routine information affirming the "status quo" is not news irrespective of how it is delivered. We also recognize the extensive literature showing that investors respond differently to "announcements" (time of information release anticipated) than to "news" where both the content and timing are a surprise. Finally, we must be selective about what we define as news, as only a minority of large asset price moves are a direct response to investors responding to news. There are a lot of "information-less" trades (see Livnat, et. al. 2013).

What is obvious from a visit to any investment firm is that investors go to great effort to receive and analyze financial news as it comes to public awareness. Based on their interpretation of the content of the news, investors revise their views on asset prices, and transact assets accordingly. *It should be very intuitive that risk assessments should also respond to news.*

News conditioned risk assessments will be immediately useful in a number of applications. Of greatest interest to active managers are the areas of alpha estimation, portfolio risk and optimization for high turnover portfolios, especially hedge funds. Another area of importance will be algorithmic trading including "high frequency" and optimal execution algorithms, especially those like the Northfield trade scheduling algorithm which are framed as multi-period optimization problems.

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Special Points of Interest:

- **Main Article: Risk Systems That Read**
- **Tech Tip: Best Practices for Eliminating Names in Your Optimization**
- **June 2015 Webinar: Assessment of Corporate Credit and Counterparty Risk**

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Recent and Upcoming Events

Assessment of Corporate Credit and Counterparty Risk Using News Flow and Sentiment

***Webinar*—June 30, 2015 • 11:00 AM EDT**

Northfield President Dan diBartolomeo will be hosting a webinar on June 30, 2015.

Abstract

Since the Global Financial Crisis of 2007-2009 history has been marked with numerous failings to correctly assess the credit worthiness of financial instruments, financial institutions and governments. Institutional confidence in the traditional credit rating agencies has been greatly reduced. One of the largest rating agencies, Standard and Poor's, recently agreed to pay a $1.4 billion fine to US regulators for alleged widespread negligence in the ratings of certain complex financial instruments.

As an alternative to the traditional rating process, this work will illustrate Northfield's proprietary RISK SYSTEMS THAT READ process of news flow and sentiment statistics to calibrate and update the credit risk of corporations and financial institutions in real time. A modified version of the Merton (1974) contingent claims model from diBartolomeo (2010, 2012) is used to break each corporate debt into two pieces, the first portion considered to be riskless debt and the second portion considered to be equity in the issuer. We utilize news flows and sentiment statistics to frequently update the expected volatility of the assets of the firm and hence the credit risk of the debt in terms of both the probability of default and loss given default.

Visit **https://northinfoevents.webex.com** to register. There is no charge to register. If you cannot attend the live session, please register and we will send you the post webinar recording.

Attilio Meucci's Advanced Risk and Portfolio Management Bootcamp

July 13 -18, 2015 • New York University • New York City

40 CE units CFA Institute, 40 CPE units GARP

The ARPM Bootcamp provides an in-depth understanding of buy-side modeling from the foundations to the latest advanced statistical and optimization techniques, in nine intense, heavily quantitative hours each day, with theory, live simulations, review sessions and exercises.

Topics include portfolio construction, factor modeling, copulas, liquidity, risk modeling, and much more.

Visit **http://www.symmys.com/arpm-bootcamp** to register, and view the detailed program information. There is a discounted Northfield supporter rate available. A short video is also available: **http://www.youtube.com/watch?v=BUnrgjNxBWk.**

Webinar Wrap-up: Risk Systems That Read

May 28, 2015 • 11:00 AM EDT

Northfield President Dan diBartolomeo hosted a webinar on Thursday, May 28th where he introduced Northfield's new approach to using quantified news flows and related sentiment scores in the prediction of asset portfolio risk. This new process can operate in real time, and can address tens of thousands of global companies and financial institutions (for counterparty risk).

The presentation slides are available at **http://www.northinfo.com/documents/645.pdf**. Contact your Northfield Sales Representative if you are interested in viewing the full presentation recording of the event.

2015 Newport Annual Summer Seminar Wrap-Up

Tennis Hall of Fame • Newport, Rhode Island • June 12, 2015

Northfield's annual summer seminar took place at the International Tennis Hall of Fame, in Newport, RI on June 12th. The seminar presented recent research and technical advances to an audience of Northfield clients and friends.

Tennis Hall of Fame

The agenda consisted of six presentations including: "Empirical Results of the Northfield Manager Skill Evaluation Process," "Does Market Efficiency Imply that Long Term Return Premia Must Be Predictable?," "Methods and Technology for Asset Owner Risk Assessment," "Why doesn't Skill = Outperformance?," "Analytical Model of Illiquidity Risk and Return" and "Risk Systems That Read."

As is customary, the seminar coincided with the USA Professional Championship of Court Tennis. Following the presentations, attendees viewed a Semi-Final Match between Camden Riviere and Tim Chisholm. Court Tennis, or "real tennis" is the medieval sport that is the progenitor of all modern racquet sports. Riviere won the match and went on to win the finals. To learn more, visit the US Court Tennis Association site at **http://www.uscourttennis.org**. After tennis on Friday evening, everyone enjoyed a relaxing oceanfront dinner party at The Chanler in Newport. The complete proceedings have been posted to our website at **http://www.northinfo.com/research.php**.

There is no charge for participation in any aspect of this event. We will accept any donation you might care to make on behalf of Pine Street Inn, Boston's primary homeless shelter. If you would like to make your donation online, please visit **http://www.pinestreetinn.org/donate/donate_now** or you can a make check payable to Pine Street Inn and mail to Kathy Prasad at Northfield. Should you have any questions please feel free to contact Andrew McLaughlin at 617-892-4172 or **andrew.mclaughlin@pinestreetinn.org**.

Webinar Wrap-up: The Choice of Model Factors Under Multiple Definitions of Risk

April 30, 2015 • 11:00 AM EDT

Northfield President Dan diBartolomeo hosted a webinar on Thursday, April 30th where he discussed how risk assessment in asset management is intrinsically multi-dimensional. Investors may be concerned in differing degrees with a multitude of risk measures such as tracking error, active risk, absolute volatility, VaR, CVaR, and "first passage" risk (drawdowns). Dan examined how the different definitions of risk might influence the choice of which factors to include in both alpha and risk models. The presentation concluded with a numerical simulation that illustrates the multi-period problem for long term investors.

The presentation slides are available at **http://www.northinfo.com/documents/644.pdf**. Contact your Northfield Sales Representative if you are interested in viewing the full presentation recording of the event.

Webinar Wrap-up: Optimal Deal Flow for Illiquid Assets

March 31, 2015 • 11:00 AM EDT

Northfield's Emilian Belev and Richard Gold hosted a webinar on March 31, 2015 where they discussed how modern portfolio theory has largely avoided the question of what to do with illiquid assets. This in turn has made it more difficult for owners of illiquid assets to directly address the fundamental issue facing all investors: what to buy, when to buy, and finally when to sell.

Recognizing that owners of illiquid assets cannot take the same path as their stock and bond counterparts, Rick and Emilian discussed Northfield's solution which merges techniques from fundamental and quantitative finance to tackle this problem in a unique but sensible manner.

The presentation slides are available at **http://www.northinfo.com/documents/636.pdf**. Contact your Northfield Sales Representative if you are interested in viewing the full presentation recording of the event.

Northfield Staff Profiles

Jason MacQueen - Director of Research

In 1980 Jason MacQueen founded QUANTEC, which was the first firm to develop risk models for equity markets outside the US. In 1984 QUANTEC launched the first global asset allocation model, including currency hedging overlays and the first use of reverse optimization for efficient portfolio rebalancing. Jason also pioneered the development of multi-factor stock selection models in the US and Japan.

In the early 1990s QUANTEC developed the first truly global risk model and a global stock selection model. In the late 1990s Jason and his colleagues developed a risk model for the American Stock Exchange to enable them to offer Exchange Traded Funds (ETFs) on actively-managed mutual funds without knowing the underlying holdings.

After selling QUANTEC to Thomson Financial in February 2001, he co-founded R-Squared Risk Management to develop Customized Equity Risk Models for institutional investors. R-Squared was recently acquired by Northfield.

By his passionate pleas for a disciplined and logically coherent approach to portfolio management, he has acquired an international reputation as speaker, consultant and iconoclast. He was educated at Oxford and London Universities, where he read Mathematics and Theoretical Physics.

Russ Hovanec - Global Business Development

Russ joined Northfield in 2001 and is responsible for building and managing strategic alliances with content and access partners and fostering existing distribution relationships on a global basis. Other assignments include serving as product manager for Northfield's enterprise risk and private wealth product lines of business.

Russ has 30 years experience in the financial markets including 14 years managing software development supporting trading and risk management at several investment banks. Prior to Northfield, he was SVP of Business Development for Redpoint Software where he was responsible for sales, product and corporate development. He was involved in the sale of Redpoint to Barra, Inc. where he became Director of Business Development for their TotalRisk product line. Prior to Wall Street he was a research meteorologist working on development and analysis of weather models at NOAA's Geophysical Fluid Dynamics Laboratory at Princeton University.

He is active in numerous investment industry associations including a board member of the Boston chapter of the Professional Risk Managers' International Association, the International Association for Quantitative Finance and Boston QWAFAFEW.

Russ has a BS degree in aeronautical engineering and economics from Miami University and an MS in meteorology and mathematics from the University of Wisconsin, Madison.

Christopher Kantos - Senior Equity Risk Analyst

Christopher Kantos is senior equity risk analyst at Northfield. Joining the firm in 2007, Chris now has responsibility for the analytical estimation and data production of all equity risk and transaction cost models of the firm.

He is active in numerous investment industry associations including the Chicago Quantitative Alliance, the International Association for Quantitative Finance, and Boston QWAFAFEW. Chris has done public presentations in seven countries including the London Quant Group, the CQA, the IAQF and Northfield events.

Mr. Kantos is a magna cum laude graduate of Tufts University in Computer Engineering.

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We also believe this new approach also holds a lot of promise for daily updating of fixed income credit risk and derivative counterparty risk. A new "white paper" describing our methods will be published this summer and a presentation on use of this approach for credit risk was given at the June 16, 2015 Boston QWAFAFEW meeting.

We also believe that asset owners and fund of funds will find the enhanced models useful for monitoring risk of their hedge fund positions. Many fund managers and asset owners also need short horizon risk assessments for regulatory compliance purposes (e.g. UCITS). While there is more work to be done, our research to date suggests that a single large news event may change forecast risk levels by 10 to 15% at time horizons as far out as one year.

Previous Literature and Research

In 1997, Northfield pioneered the use of security level information on daily changes in implied option volatility. The methodology was subsequently published in diBartolomeo and Warrick (2002, 2005), a draft can be found at **http://www.northinfo.com/Documents/534.pdf**.

This process uses percentage changes in option implied volatility to condition (adjust) volatility estimates of individual stocks. Our approach uses a regression method to separate adjustments to security level volatility into adjustments factor volatility and security specific risks, which allows for partial adjustment of risk for non-optional stocks. For example, if there is a big jump in the implied volatility of one stock it is assumed to be security specific but if most stocks in an industry see a jump in implied volatility, most of the change would be applied to the related industry factor.

An example of the benefit of such a process was that very intuitive results were obtained when markets reopened after September 11th, 2001. Based on September 17th opening option data, we estimated that a portfolio of airline stocks had a 55% increase in volatility, while a 35% increase was forecast for a portfolio of property/casualty insurers. Portfolios consisting of stocks of consumer staples producers such as food and tobacco companies showed no change.

The primary limitation of the option approach was that only a small fraction of individual securities around the world have liquidly traded options. As such, the approach was only partially effective (factor portion of risk) for most securities. To address this problem, we proposed to use quantified text news in diBartolomeo, G. Mitra, L. Mitra (2009). This paper followed the analytical structure of diBartolomeo and Warrick (2005) but replaced option implied volatility with measures of quantified news flow and sentiment. Empirical tests were conducted on high liquidity stocks (Dow Jones 30 and EuroStoxx 50 names) for the hypothesis that news flow metrics could effectively predict next day intra-day volatility. Our findings were that *news driven metrics were more efficient predictors of changes in volatility than metrics based on changes in option implied volatility* and that the predictive contribution from news flows was statistically significant even when using option data and news together. We believe that news metrics work better than implied volatility because option markets have trading costs so the changes in implied volatility are muted compared to changes in the beliefs of investors.

Beyond the published research, we had two separate teams of MIT graduate students conduct their own research projects over two years. The key findings were that unsurprisingly, changes in one day security volatility was highly statistically significantly associated with changes in prior news flows at the individual stock level. More than a dozen functional forms of the relationship were tested on a large sample of hundreds of stocks over several hundred trading days. Very intuitively, the predictive power of news flow changes decayed rapidly for the most liquid stocks and more slowly for less liquid names. The impact of news also decayed more quickly for firms with more public recognition (e.g. Apple or Google).

Another important piece of research is that of Kyle, Obizhaeva, Sinha and Tuzun (2012). This works shows that a theoretically predicted relationship between the frequency of news articles on companies, and the volatility of their stocks was fit almost perfectly by the empirical data over hundreds of companies and many years. They use a particularly clever construct suggesting that a function of stock volatility and trading volume across stocks is constant when the rate of time passage is defined in "numbers of articles" which they call "business time." The prescribed functional form is a power function that also includes an "expected changes in a trading volume" component. Related papers from Kyle show how this structure can be used to predict bid/asked spreads and more generally trading costs.

Northfield internal research has continued from 2013 to the present. All of the foregoing research suggests a *multiplicative* relationship between news flow and security volatility. During this period we also tested an *additive* functional form (H1: tomorrow's volatility goes up when a threshold value of news flow is hit today). This is an easy structure to fit in an existing factor model as a dummy variable. The factor exposure is 1 if there was "enough" news today and zero otherwise. To test this hypothesis, we estimated a GARCH style model (see Heston 1993 for details) using historic sample periods as short as twenty two trading days (roughly one month). The main data for this work had 1.7 million data points (stocks * days). We tested

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feeds from multiple providers of news flow analytics. It was very comforting to observe that data from all providers worked to a highly statistically significant degree. T stats ranged from 7 to 9, which is "off the scale" in terms of statistical significance.

The additive construct is somewhat close to the idea of using news flow (or some metric thereof such as "sentiment") as one of the factors in the risk model. We reject this formulation for a number of reasons. The first and most important is that it misses the profound basis of the entire process. We agree with Kyle, et. al. that one can alternatively describe changes in asset volatility over time as time itself is speeding up and slowing down. When there is a lot of news time is passing quickly, so volatility seems high when measured in clock time. When there is very little information coming to investors, time is passing slowly when measured in clock time. This concept was previously explored in Haug (2004).

The second reason for the rejection is that if we define some metric of news as a factor in the model, we must be able to estimate periodic returns to that factor. For example, we might believe that positive returns would arise from the arrival of "good news" and that negative returns would arise from the "bad news" or (perhaps perversely) the opposite. Nevertheless, for these effects to be factors rather than security specific effects, the preponderance of securities must react in the same way at each moment in time. We can find no statistically significant evidence of such effects over relevant time horizons in the literature.

The third reason is that by using news as a factor in the risk model we eliminate the possibility of conditioning the other factors on the model. Let's consider a hypothetical case of violent civil unrest in Nigeria which endangers production from local oil refineries. Such events would result in stories on the oil companies potentially impacted in the financial press. While capturing the company specific effects of such news would be a more useful improvement in portfolio risk, it would depend on conditioning any oil related factors in the risk model. The process should properly reflect this development on energy markets as a whole, including all firms that either produce or consume large amounts of oil related energy.

The Northfield internal research effort in 2015 was focused on independent replication of the 2013-2014 research to confirm our findings on different vendors and to perform additional tests to compare effectiveness of multiplicative versus additive functional forms. We are now in the process of finalizing analytical details and production processes of "risk systems that read" for a July 2015 introduction of daily updates of most Northfield models and delivery platforms.

Ingredients to the Conditioning Process

We are using Dow-Jones news feeds as summarized by Alexandria Investment Research. This combination gives us both very wide coverage and amazingly low latency times. Quantitative summarization of each article takes no more than 30 milliseconds and each summary is delivered to Northfield in real time. The Alexandria system "reads" both English and Japanese. In a recent 90 day period, Northfield received more than 210,000 article summaries associated with more than 21,000 different companies (as measured by ISIN IDs). Alexandria also provides similarly structured data on thousands of "non-company" topics such as countries, industries and commodities.

Each article summary provides numerous metrics including the "sentiment of the article" (good news/neutral/bad news). Brown, Harlow, Tinic (1988) provides a framework where the economic impact of bad news is stronger than that of good news. Another important indicator is "relevance." For example, an article about Verizon may peripherally mention Apple because Verizon sells iPhones. In this case, the relevance metric would be high for Verizon but lower for Apple. Other important factors include "novelty" (has similar news been previously reported recently?) and "event type" (news about a merger is probably more important than the announcement of a routine dividend payment). Northfield then compiles "today to date" aggregations of the article count on each subject.

Put most simply, Northfield is comparing the "amount of news flow" over the last few days to a long term average base level of news flow for each company mentioned in an article. The Alexandria metrics are used to weight the importance of individual articles in the overall count. The functional form is multiplicative so our conditional forward estimate of risk is our unconditional forward estimate of risk times some scalar (with default value one). The scalar is derived from the average amount of news flow in recent days in comparison to a long term average of news flows on the same company. Scalars can be above or below one.

The computation also captures multiple aspects of time decay. How long ago did the news take place? For example, there may have been a spike in news volume three days ago which will still be important, but less important than if the spike in news volume occurred today. How fast will investors notice the events? For high volume, US liquid names, the impact of news events will decay a lot faster for an obscure firm with no analyst coverage. Separately we consider the impact of time decay based on the forward risk horizon. For example, if we are trying to forecast intra-day volatility for tomorrow, an increase in news volume will have more impact than if we are trying to forecast average daily volatility over the next ten trading days.

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We also wanted to ensure that the news conditioning did not cause the risk forecasts to "wobble around" based on insignificant changes (i.e. minor random noise). To address this we include a logistic function to smooth out small changes. **(See Chart Below)**

By multiplying through by the value of the logistic function, we can minimize changes to the conditioning scalar from small changes in news flow, while including the full effect of large changes to information flows. We can change the exact shape of the logistic curve by specification of the parameters and thereby calibrate the process to empirical data.

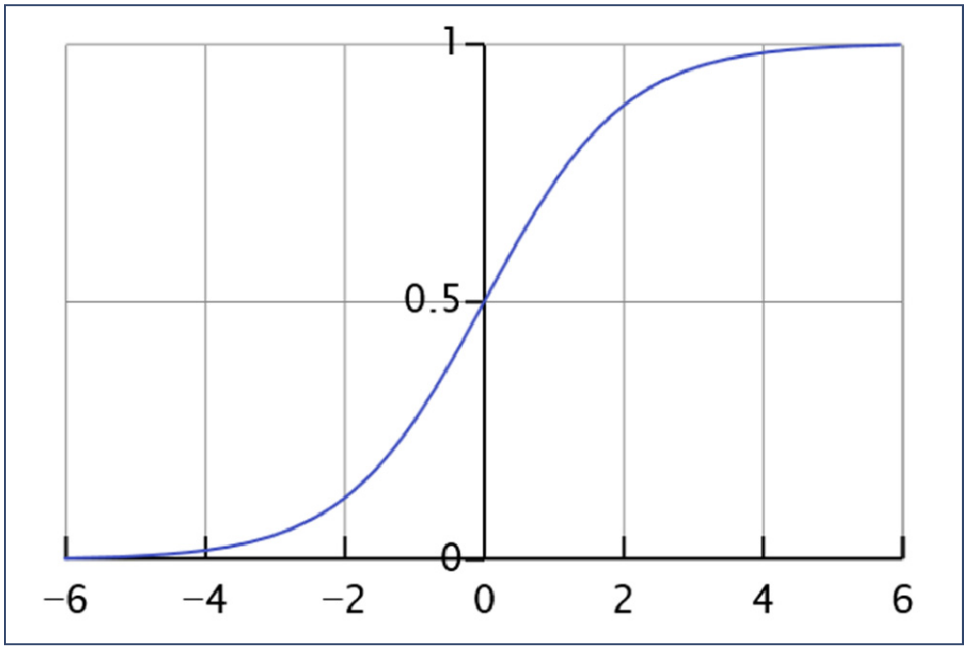
Separation of Factor and Specific Risk

diBartolomeo and Warrick (2005) shows how adjustments to the security volatilities can be "fed back" into the model to adjust factor variances and volatility estimates for stocks on which no options are traded in Equations 7 through 9. The same process was used for news flow in diBartolomeo, Mitra, Mitra (2009). If the risk model factors are close to orthogonal, the distinction into factor and specific risks can be reliably estimated with a simple regression. If the model factors are not orthogonal, you can use a nonlinear optimization process (used in Northfield models since 2009) or generate an orthogonal transform of the factors, estimate using a regression, and then translate the factors back to the original basis. The more complex nonlinear optimization is used at Northfield because it allows for the imposition of important boundary conditions such as maintaining specific risk at the security level to always be positive, factor volatilities to always be positive, and the implied security level covariance matrix (see diBartolomeo 1999) must have the mathematical property of being positive semi-definite.

Conclusions

After a lot of research and eighteen years of experience in a similar framework, we are moving ahead commercially with daily conditioning of Northfield risk models based on our proprietary measures of news flow. There is little doubt that the strategies of most investors involve some form of response to financial news as it comes forward. It is implausible that estimation of security and portfolio risk should somehow ignore this very obvious and elemental fact.

We are confident that RISK SYSTEMS THAT READ is a profound improvement in techniques for near horizon risk estimation in a variety of portfolio management, trading, and credit risk applications. Interested parties should contact their Northfield client relations representative for more information or **sales@northinfo.com**.



Tech Tip: Best Practices for Limiting Names in Your Optimization

By Steve Dyer

A standard scenario that managers encounter while using the Optimizer is the goal of optimizing a portfolio to track a benchmark while reducing or limiting the number of names held. While this is a seemingly straightforward setup, there are a number of not-so-obvious considerations and implicit assumptions to keep in mind to ensure reasonable outcomes are achieved.

There are three constraint settings that directly limit the number of assets in the optimal portfolio. The first is the **security position limit**. If you have a minimum holding size of 1%, simple algebra says that you are also telling the optimizer that the maximum number of assets in the portfolio is 100. If you have a maximum holding size of 5%, you are similarly telling the optimizer that the minimum number of assets in the optimal portfolio is 20. The second name-limiting constraint is the **threshold limit**. The threshold limit says that any small position in the optimal portfolio that is under the threshold will be sold off to other names in the optimal portfolio. Because these small positions are sold off into other names already in the optimal portfolio, it will always reduce the number of the names in the optimal portfolio. The final constraint that limits names, unsurprisingly, is the **maximum assets constraint**. The maximum assets constraint logic is very similar to that of the threshold limit: once an optimal portfolio has been reached, the smallest holdings are iteratively sold off into other existing positions until the number of assets in the portfolio is less than or equal to the limit. More detail on the logic of how these constraints are applied can be found in the June 2011 Tech Support Tip here [http://www.northinfo.com/docs/tech062011.pdf]

If your initial portfolio has 200 names, your buy list has 500 names, and your theoretical optimal portfolio has 100 names, only the 100 names in the optimal portfolio will be considered when solving for these constraints.

Constraint Priority

The most important thing to keep in mind when applying these name-limiting cardinality constraints is that threshold and maximum assets are post-optimal constraints, and are only applied once an optimal portfolio has been determined. Additionally, the linear constraints -- position limits, industry and sector limits, and attribute files -- have precedence over threshold and maximum assets. Take an example where you have a threshold limit of 0.25% and sector constraints a band of +/- 3% relative to the benchmark. The optimal portfolio has Exxon Mobil at 0.20%, but the portfolio is at the -3% lower bound for the Energy Sector. Exxon Mobil will not be sold to resolve the threshold violation because the sector limit has priority, and the sector limit cannot be violated in the process of resolving cardinality constraints. The optimizer will always give a result, even if all constraints cannot be satisfied, because we believe that an answer and detailed messaging is helpful to the user to understand the optimization process. Since cardinality constraints are the lowest in priority, *they will be broken most often*. You will have a better result if your linear constraints are not set so tight as to be the limiting factor.

RAP

You should take extra care in setting your RAP values in a name reduction project, as your RAP settings influence the number of positions in the optimal portfolio. When saying that you want a smaller number of names, you are also implicitly saying that you are willing to hold more concentrated positions, and therefore you are also more willing to take stock-specific risk than factor risk. Your RAP values should reflect this. A higher Unsystematic RAP value says that you are willing to take position-level bets and will result in fewer names; a lower Unsystematic RAP avoids concentrated positions and results in a more diversified portfolio.

Transaction costs

A typical reason you want to control the number of positions in a portfolio is to avoid the costs of trading securities with high transaction costs. If this information is not reflected in the problem set up, use of cardinality constraints to limit the positions will create biased solutions. Be sure to include reasonable trading costs so that the optimizer will not make small, low utility trades that will just be undone by the name limiting constraints.

Quantifying the effect of constraints

One easy way to see how far cardinality constraints are moving the optimal portfolio away from the "theoretical" optimal portfolio is to take the standard deviation of the MUBuy and MUSell columns in the marginal contribution reports [Read more about marginal contribution here: http://www.northinfo.com/docs/tech092011.pdf] for the optimal portfolio. If the optimal portfolio has no constraints at all, all the MU values will be equal and the standard deviation would be zero – in other words, if the portfolio is optimal, no one trade will increase utility more than another. As you add in more constraints, these values will be driven further apart, meaning the portfolio is less close to the theoretical optimum, and there are trades that could be made that would increase utility that are prevented from happening because of constraints. To illustrate this, I created a simple example starting from cash and tracking the

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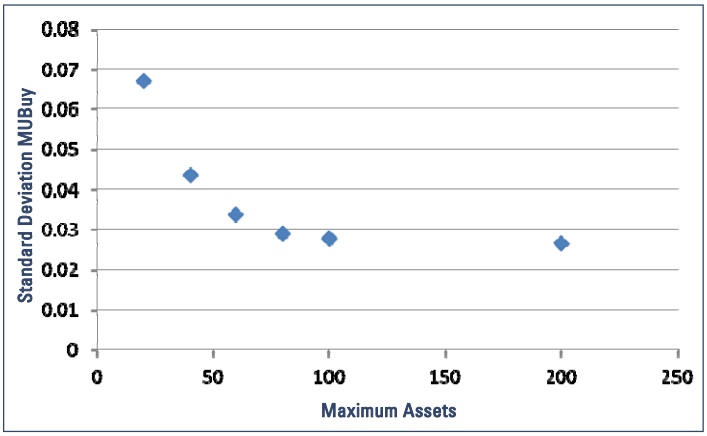
S&P 500 and optimizing with varying maximum asset limits. You can see that as the maximum asset limit gets smaller, the standard deviation of the MUBuy rapidly increases.



Avoiding unwanted statistical biases

The last consideration to keep in mind is the statistical biases that are created when using cardinality constraints too aggressively in a minimum variance or index-tracking type of problem. Whenever we estimate risk on different securities, there will be errors in the estimates as conditions change [http://www.northinfo.com/docs/tech0914.pdf]. Even if we are correct on average, we will be overestimating the risk on some securities and underestimating the risk of others. If we want to do something like "the minimum risk portfolio of 40 stocks," the optimizer will have no choice but to look for stocks that are estimated to have very low risk. For low risk stocks, the likelihood that we have underestimated the risk is greater than the likelihood that we have overestimated the risk. As such, the risk estimates will tend to be biased downward, and the realized risks will be higher.

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Staff Speaking Engagements

On June 16th, Northfield President Dan diBartolomeo spoke at the Boston QWAFAFEW meeting. The topic was "Credit Analysis using Risk Systems That Read."

Northfield's Jason MacQueen attended a CFA Society Luncheon on May 28th where he presented "Why Doesn't Skill = Outperformance?"

Dan and Jason MacQueen will be giving presentations at the Rutgers University IMS/FIPS Conference in New Jersey on June 27th. Dan will be presenting "Portfolio Optimization with Skew, Kurtosis, VaR and CVaR" and Jason will be presenting "Smart Portfolios." Northfield clients who want to attend the event can get a 50% discount on the registration fee by using the discount code "fips" when registering, www.fsrm.rutgers.edu/fips2015.

Dan will be at the Unicom/Fitch Learning Workshop in London on July 14th and 15th. He will be discussing "The Microstructure and Risk of Low Volume Markets" on the14th. On the 15th he will be presenting "Risk Systems That Read."

On July 16th, Dan will be speaking at the Advanced Risk and Portfolio Management Bootcamp, at New York University. The topic will be 'The Semantics of Financial Fraud."

If you have any suggestions of what you would like to see covered in upcoming issues, please e-mail your ideas to general@northinfo.com

For a complete index of all former Northfield News articles, visit http://www.northinfo.com/documents/314.pdf

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