December 2012

Northfield News

A Newsletter for the Friends and Clients of Northfield

The 3rd Generation Northfield Risk Models

By Anish Shah

Several years in the making, the next (3rd) generation of Northfield risk models ships with the March 31, 2013 release. The release includes all Northfield models except the US Short-Term model (revised in 2010) and EE and REIT models (coming later in the year). For the first three months, live update will deliver both 2nd and 3rd generation models in parallel.

Many have asked, "The models have worked well. Why change anything?" First, increasing coverage called for minor structural changes. Twelve emerging markets – Bulgaria, Croatia, Kazakhstan, Kenya, Lebanon, Mauritius, Nigeria, Serbia, Trinidad & Tobago, Ukraine, United Arab Emirates, Vietnam – are now among the 80 countries covered by the Global model. To accommodate these and future additions, the model's set of region factors was re-cut and expanded. Likewise, investor interest and trade across markets have tightened their global link.

The chart at the top of page three shows the percentage of variance explained by the market for region indices that appear as factors in the 2nd generation global model.

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Why Northfield is Better

By Nick Wade

Over the last fifteen years of going out and talking to people about risk models, the most frequent question I've had is "Why?" Why do we do things the way we do? Why don't we do the same things as everyone else? So I thought it might help if I wrote some of the reasons down in plain English without using any equations.

The things that seem to attract the most attention are:

- Why we produce all kinds of different models rather than just Fundamental models, or just Statistical models, and when each approach is a good or a bad idea
- Why we choose to promote an adaptive hybrid risk model instead of a fixed factor structure in many situations
- Why we advocate forward-looking signals instead of just historical data
- Why we integrate across asset classes instead of just focusing on the historical behavior of single asset classes
- How we model illiquid assets, and why we don't use appraisal valuations

Our approach to risk model building has always been guided by considering the most *appropriate* approach in particular circumstances. Northfield produces fundamental, macro, purely statistical, and adaptive hybrid factor models both with and without forward-looking signals. These models are *all* appropriate in different situations – no single approach is always the best.

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Special Points of Interest:

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Inside This Issue:

Upcoming and Recent Events

Webinar: Liquidity Planning Tools and Strategy Capacity for Equity Markets

January 23, 2012 • 11:00 A.M., E.S.T.

Northfield President Dan diBartolomeo will be hosting a webinar on January 23rd where he will be discussing the liquidity shortages during the Global Financial Crisis and the need for both asset managers and institutional investors to have well articulated liquidity policies as part of their strategic investment planning.

There is no charge to participate. Visit **http://www.northinfo.com/events.php** to register and view the full presentation abstract. Registration opens on January 2nd.

Northfield Asia Seminar Wrap-up

Hong Kong • Singapore • Sydney • Tokyo • October-November 2012

Northfield hosted our annual Asia Seminar Series with four highly successful events in Hong Kong, Singapore, Sydney and Tokyo. The seminars showcased our research on key topics in investment and risk management to our growing family of Australian and Far Eastern clients and prospects and broadened awareness of the range and depth of Northfield products, services, and research.

The presentations were given by Northfield's Dan diBartolomeo, Chris Kantos and guest speaker Lloyd Kurtz, CFA, chief investment officer of Nelson Capital Management. Topics included: "A Structural Model Of Sovereign Credit Risk," "Macro Factors in Corporate Governance," "Portfolio Formation with Illiquid Assets," "Real Risk of Pension Funds: Funding Guarantees," "Risk Considerations for International Investors" and "Wealth Management, Investor Suitability, Fiduciary Requirements and Financial Regulation."

The proceedings are posted at **http://www.northinfo.com/research.php.**

Northfield's London Research Seminar Wrap-up

Vinopolis • No. 1 Bank End • London • November 7, 2012

The Northfield 2012 European Investment Seminar was held in London at Vinopolis in London on November 7th. The purpose of the seminar was to highlight recent advances in analytical techniques for the investment industry to our growing number of European clients and prospects.

The presenters included Northfield's Dan diBartolomeo, Emilian Belev, Mike Knezevich and Daniel Mostovoy. Guest speaker Louis Scott of Kiema Advisors also gave a presentation. The topics included: "A Structural Model Of Sovereign Credit Risk," "Downside Risk," "Risk Management for International Equity Investors," "Third Generation Northfield Risk Models" and "Wealth Management, Investor Suitability, Fiduciary Requirements and Financial Regulation."

The seminar concluded with a well deserved post seminar reception. There was no cost to attend, however, donations to the Prince's Trust were strongly encouraged. The Prince's trust is a very worthwhile organization that makes a huge positive difference to the lives of many thousands of young people.

The seminar proceedings have been posted to **http://www.northinfo.com/research.php**

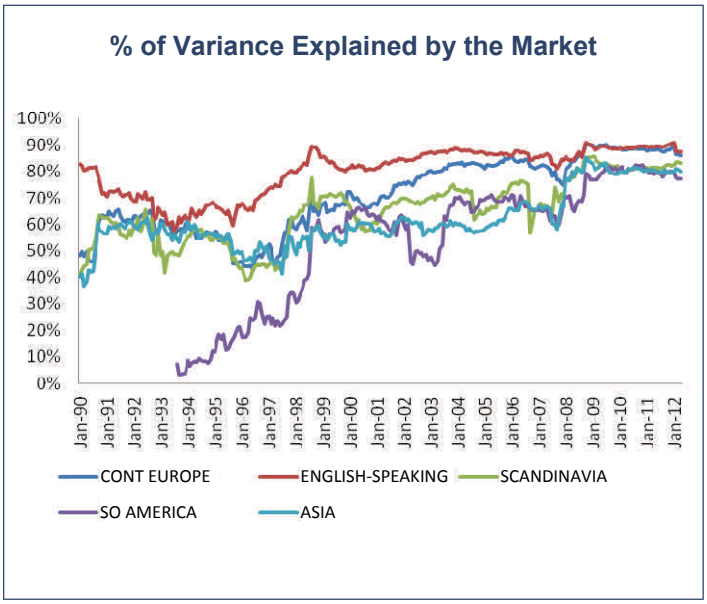
Webinar Wrap-up: Third Generation Northfield Risk Models

November 8, 2012

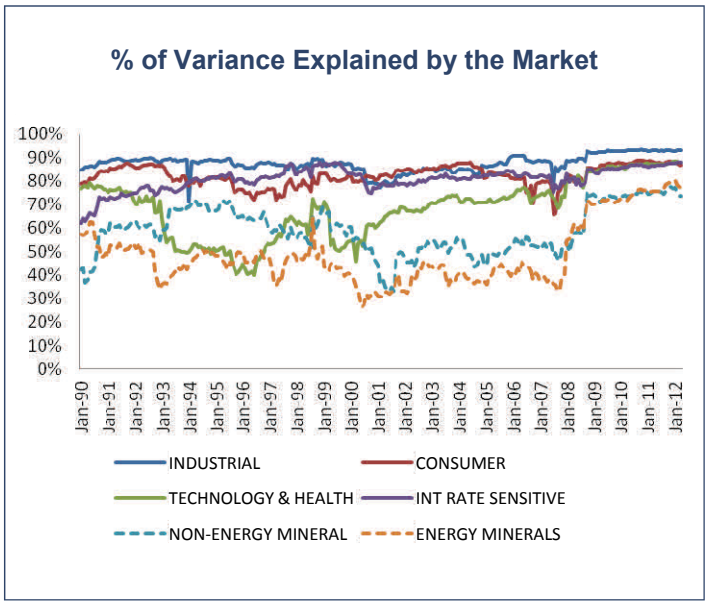
Northfield's Anish Shah hosted a webinar on November 8th where he discussed the upcoming release of Northfield's Third Generation Risk Models. The presentation described the considerations that led to updating the models and offered a technical overview of the econometric and structural changes. Samples of the second and third generation model data were provided to illustrate the benefits of the update.

The presentation slides are available at **http://www.northinfo.com/documents/528.pdf.** Contact your Northfield Sales Representative if you are interested in viewing the full presentation recording of the event.

(Models, Continued from page 1)



Regions have become more alike. The same holds true for sectors, excluding minerals:



To better capture current security behavior, the 3rd generation Global model has market as its first factor and redefines sector and region factors to be stripped of market. A side benefit: the form, market then sector, parallels that of the both 2nd and 3rd generation Northfield Single Market models; risk comparisons across models become easier and clearer.

To understand other changes, consider that a risk model serves four essential functions:

1. differentiating between high and low volatility portfolios
2. capturing volatility changes over time
3. informatively identifying what sources contribute to a particular portfolio's risk
4. acting as a risk measure for portfolio construction (optimization)

Managers, particularly those holding fully invested long only portfolios, are perhaps most interested in the first. Both the 2nd and 3rd generation models do this well, so it's enough to say its importance has not been forgotten.

In 1998 (US Short-Term Equity[1]) and 2008 (Adaptive Near Horizon models[2]), Northfield introduced models that incorporate instantaneous data - e.g. option implied volatilities - to forecast behavior over a few days. With market regimes ever more varied, such information becomes increasingly relevant to the long-term manager navigating current conditions. Moreover, properly attenuated, it improves forecasts over a long (1 year) window. With the release of the 3rd generation models, Northfield offers managers both.

Clients can blend any long-term model with its most recent month-end Near Horizon counterpart. Setting the blend to 100% Near Horizon forecasts risk as it is now. A softer blend[3] works for a longer window. (For those content with the existing, 0% Near Horizon yields the familiar long-term model.)

A good risk model tells a manager not only how risky but where the risk comes from. As mentioned earlier, the 3rd generation Global model has a global market factor to correctly identify risk common to all markets. Its region factors (previously numbering five: Continental Europe, English Speaking Countries, Scandinavia, South America & Mexico, Asia) have grown to eight: USA/Canada, Latin America/Caribbean, Developed Europe, Emerging Europe, Middle East/Africa, Japan, Developed Asia/Asia Pacific, Emerging Asia/Asia Pacific. The Technology & Health sector factor of the Global and Single Market models has separated into two to better capture and label risks.

Portfolio optimization places another imposition: the model needs to be bullet proof. Statistical estimates are unavoidably made with error. A portfolio made by hand doesn't react to the errors of the risk model; errors wash out. In contrast, an optimizer dynamically adjusts portfolio weights to the numbers. Errors both affect composition and propagate to portfolio forecasts. To increase accuracy and robustness at the individual security level, 3rd generation models (US Fundamental model excluded[4]) estimate

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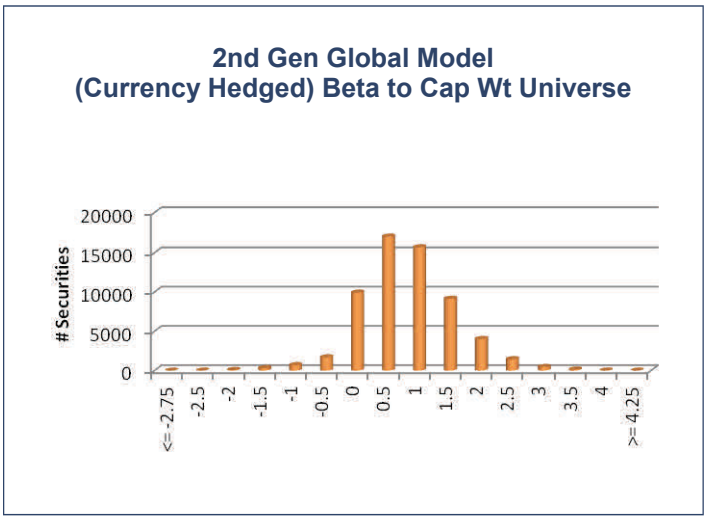
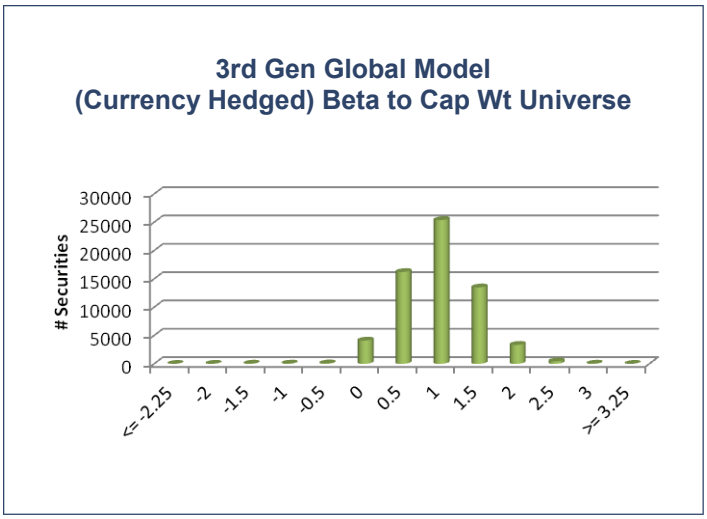
factor exposures via Bayesian instead of frequentist inference.

The difference between the two techniques: A frequentist uses only observations. A Bayesian combines observations with prior beliefs about how likely things are. From a distance seeing a 10' tall giant, a frequentist reports the person is 10' tall. A Bayesian would think 1) the average person stands 5'10" ± 8" and 2) her not perfect eyesight adds around 1' of error to the measurement, so she reports someone 6'5".

In our case, we are measuring not a man's height but a stock's sensitivities to risk factors. Based on goodness of fit, number of observations, and variation within peer group – estimated numbers fall somewhere between the raw observations and the prior belief. Illustrating what a difference it makes, the following **charts show** the distribution of stock betas to the market for the 2nd and 3rd generation models. Notice the drop in number of extreme betas, above 2 and below 0.





This brief overview leaves out many other, often subtle but well thought through, technical changes. A detailed and graphical presentation[5] is online. The improvements are the result of extensive testing. We expect that clients, even those very satisfied with the existing models, will find – in increased coverage of emerging markets, in capturing time varying volatility and accurately forecasting long-term and short-term risk, in more informatively describing the sources of risk, in stock level accuracy and the performance of optimized portfolios – significant improvement in the 3rd generation release.

Endnotes

[1] Northfield US Short-Term Equity Model,
http://northinfo.com/documents/5.pdf

[2] Northfield Adaptive Near Horizon Models,
http://northinfo.com/documents/356.pdf

[3] Empirical tests suggest a blend of ~20% Near Horizon for forecasting over 1 year

[4] In all generations of the US Fundamental model, factor exposures are estimated from financial statement data

[5] Northfield Third Generation Models,
http://northinfo.com/documents/528.pdf

Northfield Staff Speaking Engagements

On November 27th, Northfield President Dan diBartolomeo spoke at a seminar on Markowitz Methods at Fordham University in New York. The topic was "Portfolio Formation with Illiquid Assets."

Dan will be speaking at the QWAFAFEW New York meeting on January 8th where he will be presenting "Analytical Models for Evaluating Sovereign Debt."

Dan will be presenting "Risk Modeling Concepts for International Investors," at the upcoming FactSet Risk Management Nordic Seminars in Copenhagen on February 6th and Stockholm on the 7th.

Northfield Asia's Nick Wade was a panelist at a FactSet Risk Management event in Tokyo on December 5th.

Tech Support Tip: Multiple Account Feature - Compressed Output

By James Williams

This Tech Support Tip discusses the compressed output option that is available when the "Multiple Accounts Optimization" feature is enabled. The Multiple Accounts Optimization feature is a very powerful tool that allows users to efficiently input multiple portfolios via the aggregated portfolio file or via individual account project files. Output reports can now be created using a compressed output format which allows users to efficiently output reports to database or other 3rd party applications for further analysis.

The Multiple Accounts Optimization feature was discussed in the March 2012 Northfield Newsletter which is available for download at:

http://www.northinfo.com/Documents/498.pdf

To summarize the March 2012 Tech Support Tip, the Multiple Accounts Optimization feature allows users to quickly analyze risk or to optimize dozens or more portfolios. Typical use cases include: 1) running multiple portfolios over a single period for risk analysis or optimization. 2) Running time series risk analysis or optimization on one or more portfolios 3) Performing fund-of-fund risk analysis on master fund as well as underlying funds.

Output Reports

The Multiple Accounts Optimization feature uses the same output reports as a normal single risk or optimization project. However, the report format is slightly different to accommodate multiple portfolios as seen below:

Optimization Summary
Date=12/12/2012; Time=09:07 pm, Account ID: Test of Alpha Set 1
Project: C:\Northinfo\Nisopt2008\Samples2008\fund\FUNDOPT_AGG.fnd

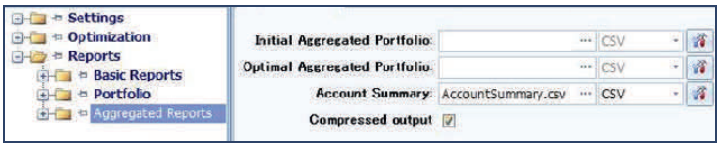
	Initial		Optimal	
	Return	Risk(v)	Return	Risk(v)
Factor	0	12.85	0	3.12
Stock Specific	0.1	8.43	6.77	8.84
Total	0.1	21.28	6.77	11.96
Tracking Error	4.61		3.46	
Portfolio Utility	-0.75		2.82	

Optimization Summary
Date=12/12/2012; Time=09.07 pm, Account ID:Test of Alpha Set 2
Project: C:\Northinfo\Nisopt2008\Samples2008\fund\FUNDOPT_AGG.fnd

	Initial		Optimal	
	Return	Risk(v)	Return	Risk(v)
Factor	0	1.92	0	3.95
Stock Specific	0.65	5.96	15.56	17.13
Total	0.65	7.87	15.56	21.08
Tracking Error	2.81		4.59	
Portfolio Utility	0.34		8.44	

Compressed Output Reports

The new compressed output report is available by selecting the "Compressed output" checkbox from the Reports | Aggregated Reports folder on the project tree as shown below:



As with the normal Basic Reports, compressed output reports can be saved as individual files using .CSV, .TXT, .EURO formats or as workbooks in .XLSX format. Below is a comparison of the Holdings Summary report saved in the normal uncompressed format and saved in the compressed format:

Holdings Summary (Normal Uncompressed Format)

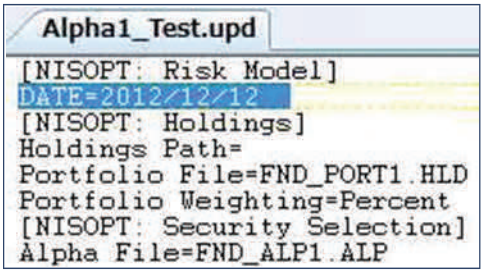
A	B	C	D	E
Holdings Summary				
Date=12/12/2012; Time=09.07 pm; Account ID: Test of Alpha Set 1				
Project:C:\Northinfo\Nisopt2008\Samples2008\fund\FUNDOPT_AGG.fnd				
		Stock Value:		10,000,000
		Roundbase		1
		RoundedCapGain		-
ID	Name	Price($)	Init WT(%)	Opt WT(%)
IBM	Int. Bus MCHS	190.07	3.00	5.00
AAPL	APPLE	585.28	-	5.00
AGN	ALLERGAN	92.75	-	5.00
ICE	Intercontinental EX	132.15	-	5.00
VNO	Vornado Realty TST.	76.43	-	5.00
WPO	Washington PST. 'B'	367.06	-	5.00
VFC	V F	160.51	1.47	4.82
KLAC	KLA Tencor	45.47	3.79	3.79
V	VISA 'A'	149.71	-	3.24
MSFT	Microsoft	26.615	3.20	3.20

As seen at the top of the next page, the compressed file format contains two extra columns: "Date" and "Portfolio". The Date column represents the date of the project analysis and is set by changing the Date field from the Settings | Risk Model folder on the project tree or on the project (update) file directly as **seen on the next page**:

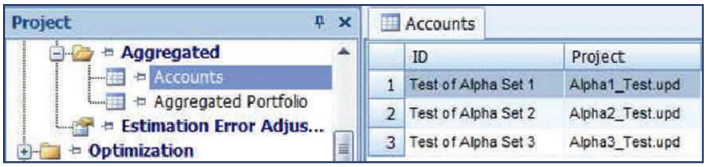
Holdings Summary (Compressed Format)

A	B	C	D	E	F	G
Date	Portfolio	ID	Name	Price($)	InitWT(%)	OptWT(%)
12/1/2012	Test of Alpha Set 1	IBM	Int. Bus MCHS	190.07	3.00	5.00
12/1/2012	Test of Alpha Set 1	AAPL	APPLE	585.28	-	5.00
12/1/2012	Test of Alpha Set 1	AGN	ALLERGAN	92.75	-	5.00
12/1/2012	Test of Alpha Set 1	ICE	Intercontinental EX	132.15	-	5.00
12/1/2012	Test of Alpha Set 1	VNO	Vornado Realty TST.	76.43	-	5.00
12/1/2012	Test of Alpha Set 1	WPO	Washington PST.'B'	367.06	-	5.00
12/1/2012	Test of Alpha Set 1	VFC	V F	160.51	1.47	4.82
12/1/2012	Test of Alpha Set 1	KLAC	KLA Tencor	45.47	3.79	3.79
12/1/2012	Test of Alpha Set 1	V	VISA 'A'	149.71	-	3.24
12/1/2012	Test of Alpha Set 1	MSFT	Microsoft	26.615	3.20	3.20

Project file: Alpha1_Test.upd for Account ID: "Test of Alpha Set 1"



The portfolio column represents the name of the account or portfolio which is being analyzed. This name comes from the ID field in the Accounts file table as seen below.



Aggregated Reports

In addition to the Basic Reports that are available in the Optimizer, a new folder called "Aggregated Reports" is available once the Multiple Accounts Optimization feature is enabled and three additional reports can be created:

- **Initial Aggregated Portfolio** – consists of three columns: Account ID | Security ID | Security Weight. Each account is listed below each other in continuous rows.

- **Optimal Aggregated Portfolio** – same format as Initial Aggregated Portfolio. When using the compressed format the Initial Aggregated and Optimal Aggregated Portfolio files are created in database friendly table formats with Account ID, Security ID and OptWt (% or Shares)

A	B	C
ACC ID	ID	Opt WT%
Test of Alpha Set 1	AAPL	5.00
Test of Alpha Set 1	AGN	5.00
Test of Alpha Set 1	AMGN	0.45
Test of Alpha Set 1	AMZN	1.73
Test of Alpha Set 1	AXP	1.44
Test of Alpha Set 1	CAG	1.68
Test of Alpha Set 1	CAT	1.62
Test of Alpha Set 1	CF	1.63
Test of Alpha Set 1	CHL	1.18

- **Account Summary** – Top level view of risk and optimization statistics for each portfolio (and of the combined or aggregated portfolio). See the **table at the bottom** of the page for example:

For further inquiries, contact Technical Support in Boston: **support@northinfo.com** or call 617.208.2080. European clients can contact: **support-europe@northinfo.com** or call +44 -(0)-20-7801-6222. In Asia, call +81(0)3 5403 4655 or +61 (0)2 9238 4284 or **support-asia@northinfo.com**.

A	B	C	D	E	F	G	H	I	J
Acc ID	PortVal	InitTrackErr	OptTrackErr	InitFactVar	InitStockSpecVAR	OptFactVar	OptStockSpecVAR	InitRSquare	OptRSquare
Test of Alpha Set 1	10,000,000	4.61	3.46	12.85	8.43	3.12	8.84	0.97	0.98
Test of Alpha Set 2	10,000,000	2.81	4.59	1.92	5.96	3.95	17.13	0.98	0.96
Test of Alpha Set 3	10,000,000	2.81	3.00	1.92	5.96	1.32	7.65	0.98	0.98

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Further, our belief is that any event – or any perception – that changes the expected size or uncertainty of the future cash flows of a firm should affect the risk estimates of all marketable securities issued by that firm, and every derivative written on them. Unfortunately, that's not the case with most of the commonly used risk tools in the industry. A risk model should be integrated across asset classes to make the most of all the information available.

The most important questions we ask:

- Data quality, availability, and comparability?
- Client investment strategy – active versus passive, diversification level?
- Target Market dynamics – tightly linked, or disparate? Do the securities all move together?
- Horizon – minutes, days, weeks, months, years?

Accounting statements, standards, and reliability differ dramatically by market. As a result, we avoid using fundamental (accounting) data whenever we are considering global or regional models, or frontier markets. To illustrate: in pension liability accounting in some countries, there is nothing on the balance sheet at all. Current pension payments are considered an expense when incurred. In other countries the situation is quite different. Clearly this difference will dramatically impact book value calculations. Another excellent example is the netting of derivatives; Under US GAAP you can offset two derivative contracts (one long, one short) even if they are OTC contracts with different counterparties. Under international standards (i.e. Basel) you can't.

The client's investment strategy is important too - for purely passive or hedging purposes we are happy to provide pure statistical models – but for active management, the asset manager needs to attribute risk to a set of factors that are explainable in terms of real world effects. Purely statistical factors are often only tenuously connected to real-world effects by correlation and wishful thinking. You cannot get from correlation to causation – they are two distinctly different things.

In terms of estimation error, not all models are created equal either. Diversified portfolios can benefit from time-series modeling: estimation error in security exposures (loadings) diversifies away with increasing numbers of names in the portfolio – in a similar fashion to security-specific risk. Fundamental models on the other hand suffer from estimation error in factor returns, which cannot be diversified away. It hangs around in the covariance matrix, where it bothers all portfolios irrespective of the number of members. However, for very concentrated portfolios this exact effect actually makes fundamental models safer – and that's partly why we continue to produce fundamental models. The worst of the bunch are Statistical models, which contain error in both loadings *and* factor returns – the price you pay for being unwilling to specify any of the factors at all.

Recent history tells us that – paraphrasing Animal Farm – some banks are more equal than others. Some banks have been colossally negatively impacted, sold off for pennies, bailed out at huge expense, and other banks have rolled along virtually unscathed. In fundamental models, security exposures to groups – such as industry or country - have to be estimated using "membership variables" (the simplest example is a set of "1"'s or "0"'s) The implication is that – for example - all banks react the same way to events in the banking sector. Clearly that is a dubious assumption, and that type of assumption becomes worse as we look beyond one market toward regional or global models. Time-series models on the other hand allow each security to have a unique beta even to groups, such as country, industry, sector, or region. This properly accounts for the nuanced differences in observed behavior across industry.

In fact, even "fundamental" themes like size, or style can often be better represented using exogenous factors. For example, in some of our models we represent sensitivity to "size" as the security beta to the return spread between indices of large and small securities – this is somewhat similar to the Fama-French size factor. The important thing to note is that the size exposure has nothing to do with a security's market capitalization - this measure determines the exposure of the security to size effects based only on how it has *actually behaved* historically, rather than some accounting abstraction.

We should pause here and reflect for a moment. It's very easy to lose track of the most important objective – a factor model is really just a set of themes that represent shared behavior; how securities have actually behaved. Those factors can be anything, as long as they capture some of the shared behavior of securities. If we're not careful we forget that and – for example – it becomes such a habit to think of Size as "Log Market Cap" that we forget that there's another way of doing it. Or in fact that there are many other ways.

Let's take a step back and look at the evolution of risk models for a moment:

From the end of the Second World War until the early seventies, investing was a fairly slow-moving grazing animal. Gradually "modern" portfolio theory developed – Markowitz in 1952, Sharpe in 1965… and then in the early seventies things suddenly got a lot more exciting very fast. Exchange rates floated, mutual funds became hugely popular – they now account for around a quarter of household wealth in the US - and Black-Scholes (1973) changed the

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way people traded. Gone were the days when you had to have a directional opinion. Now you could bet on all kinds of other dimensions, and – horrifyingly – convert risk tomorrow into return today. The other huge advance in the early seventies was Merton (1974), which formalized an analytical model for the capital structure of the firm that for the first time explicitly connected together all marketable securities issued by a firm together with its assets, liabilities, and by implication any derivative securities written on top of any of that.

Unfortunately, given the wealth of new information and analytical connections across asset classes that these new developments provided, these sources of information took a while to make it into mainstream risk management tools. In fact generally speaking they still haven't.

The first multi-factor models for risk and return date back to King (1966), and subsequently to a series of papers by Rosenberg et al (1974-76). Risk models were born in that pre-Black Scholes world where change was slow, and the linkages across asset classes hadn't been formalized analytically. So the first models looked only at historical data, and only within single asset classes. The approach to risk modeling at the time was to find a set of factors that explained the historical returns of one asset class (say equities) – without looking at any other asset classes or at the option market - and then revise that factor set in a decade or so when things had changed a bit and it was obvious that the current factor set was missing a few things.

By the mid-nineties in the run up to the internet bubble, we had come to the conclusion that the current risk models reflected a dangerously static view of a not-very-static world, and that a historically-based risk model was missing out on a lot of valuable information. In addition to being historically fixated, the models were myopically glued to one asset class. If credit spreads went crazy, or if implied volatility went off the charts, or if a huge number of news stories suddenly started coming out about a particular stock this would of course make traders, portfolio managers, strategists, and CIOs sit up and take notice. But the current equity risk models wouldn't notice a thing. And we thought that was idiotic. And – more importantly – we thought we could do better.

We felt that the rate of change, or the speed of evolution in the markets required a more adaptive approach. We needed a way that risk models could adapt and learn as the environment changed – rather than wait until the model was obviously broken and then release a new one. That's why we settled on the Adaptive Hybrid risk model. The model factor structure quite literally learns new effects as they become important. And if they're temporary effects, it has no qualms about forgetting them again. And just as importantly the core of the model remains the same – those intuitive long-term persistent relationships between the economic environment and the fates of a company remain accounted for and observable.

Imagine you drive home from work in a blizzard, you park your car in the garage and then go out to your car the next morning and find it's fully equipped itself overnight with tractor treads, a snow plow, and has all your ski gear strapped to the roof. That's an adaptive model. We've been building them now for about 15 years. But a forward-looking model would be even better – it would get the snowplow ready the night before the blizzard, based on the weather forecast.

Our weather forecast turned out to be one of the magical results of Black-Scholes – the sudden bounty of "implied volatilities". Black Scholes is a brilliant but actually fairly simple formula, and there aren't many moving parts. So you end up talking about implied volatility a lot, because that's the free parameter. For the first time in risk management world we had a market participant consensus view on the future in terms of risk – the expected future dispersion of returns. The implied volatility tells us what the option market participants think is going to happen between now and the option expiration. This is a kind of "crowd sourcing" if you like – an "ask the audience" option.

Naturally we thought that it might help improve risk forecasting, since there had been a flurry of academic papers in the mid-nineties extolling the virtues of implied volatility as a predictor of future realized volatility – it performed better than historical volatility, or exponential weighting, or GARCH; at least over shorter time horizons (e.g. 30 days). Clearly there was information in the implied volatility signal, and we wanted to harness that to make better risk forecasts. So in 1997 we launched an adaptive model in the US that used implied volatility to adjust risk estimates, and it worked very well. The result of this research was the first ever truly forward-looking risk model.

The difficulty was generalizing the approach so that we could use it in any market anywhere, even if there were no liquidly traded options. The solution came to us as an application of another alternative source of information that we had been working on internally – cross-sectional dispersion. The amount of "variety" in the market, or the extent to which securities moved together. For markets where we couldn't get implied volatility data that was clean and informative, we could use cross-sectional volatility to give us a revised view of future time-series volatility - Steve Satchell wrote a great paper in 2004 that explains the mathematical linkage between time-series and cross-sectional volatility that is well worth reading.

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(Better, Continued from page 8)

So from roughly a decade of research we had revolutionized the risk model world with a set of adaptive hybrid models, and a parallel set of near-horizon forward-looking adaptive hybrid models for all those folks who needed a short-term view.

We also felt that a risk model that focused myopically on one asset class was ill-informed. We wanted a way that the risk model – just like a portfolio manager, trader, or CIO – could look at the newspaper or a terminal and say "Yee Gads! The spreads on sector X are off the chart, and the implied vol. on Y has declined a lot, and that company's merger talks are on hold so I bet volume is thin" and have all that information reflected in the risk numbers. This doesn't happen in a traditional risk model, because all it looks at is single asset class historical data.

Merton (1974) gave us the analytical framework we needed to do exactly that; Using a version of the Merton approach, we can take a change in implied volatility for a stock option, and convert that into a revised view of credit risk for a corporate bond (even one that hasn't traded for a month). Or, we could take a credit-spread change and back out an adjustment to equity risk, or a revised option valuation. We can wag the dog.

We can also turn the Merton option on its head, and extract an "implied life" of the firm – basically solving for the expiration date of the option. So we can make statements like "there is a 50% probability that firm X will default within the next 5 years" albeit with a handful of fine-print clauses attached. We can also look at changes in the implied life, and with the aid of some fairly tortuous mathematics arrive at the joint probability of default for a specific bond portfolio.

This last ingredient brings us full circle. We can now implement our belief that any event – or any perception – that changes the expected size or uncertainty of the future cash flows of a firm should affect the risk estimates of every marketable security issued by the firm, and every derivative written on them. Our models are integrated across asset class, and events that affect securities in one asset class naturally impact risk estimates in all other asset classes. Again, unfortunately, that's not the case with most of the commonly used risk tools in the industry.

Since 2003 we've focused on the last and most difficult piece of the puzzle – what is the risk of something that doesn't trade?

The de facto standard in illiquid asset classes is to base valuations on some form of appraisal or to discount cash flows based on a single cap rate. Return volatility is thus apparently very low, since the appraisals don't change much, and the correlations with other asset classes are also very low. Which adds up to making illiquid/unlisted assets look very attractive – they offer good returns, low risk, and lots of diversification. Unfortunately, if it looks too good to be true, it probably is… What you can't see from appraisals is how the value and risk of these assets varies in between appraisal dates – the appraisal smoothing hides the true risk of the asset - or any linkage to the underlying drivers of risk, and the extent to which those common drivers are shared with or hedged by the securities that you own in other asset classes.

Our approach was to think of any asset as a set of cash flows that are exposed to interest-rate risk (because they occur at some point in the future) and credit risk (because they are uncertain). For investment property, for example, we look at the tenant cashflows from the building and model their linkage to the local, national and global economy. For an infrastructure asset, we look at the revenue streams from the asset again as a function of the local, national, and global economy. The important outcome from our analysis is a factor representation of risk for illiquid assets.

The key advantages of this approach:

- It means that "real" assets can be included in a regular risk model just like marketable securities
- It gives a clear view of the underlying drivers of risk
- It helps managers implement asset allocation decisions as a set of factor themes, which in turn helps them get around the loss of the option to rebalance with illiquid assets

Trying to draw together all these disparate themes without making a hopeless tangle, let me just summarize by saying you should consider the assumptions behind any risk model, and decide first and foremost if the approach is appropriate. If it is at least appropriate, then secondly satisfy yourself that it has broad enough coverage of the securities and asset classes that you need. And then finally ask yourself – if you are still faced with a choice of models – which of the models on your short list represents the kind of innovative and informed risk tool that you would feel most confident using, and even promoting as a competitive advantage to your potential clients.

I hope that by explaining our choices and clarifying why we do what we do you will join us in our pursuit of "better."

Please call your local Northfield office and chat with us about these points – or tell us why you think we are wrong! We love talking about this stuff.

Upcoming Changes to the Northfield Open Optimizer

By Mike Knezevich

Northfield is preparing for a large number of changes to the optimizer product with the March 31, 2013 release. Before installing, please be sure to back up any pertinent files.

Discontinuation of NisOpt2008:

To focus our efforts enhancing optimizer functionality, Northfield will discontinue NisOpt2008 as discussed in the March 2012 Newsletter. Please see:

http://www.northinfo.com/Documents/498.pdf

Although most clients have transitioned to NisOpt2011, those who have not and would like to continue using the 2008 version beyond March 31st should contact their Northfield sales or support representative to discuss a transition plan.

Compatibility with Model Enhancements:

Northfield's third generation risk models

Northfield's third generation risk models will require small developmental changes to be delivered through the optimizer.

For additional information on the 3rd generation risk models please see a recorded webinar by Anish Shah which is available by contacting your Northfield Sales Representative. The webinar presentation slides are available at:

http://www.northinfo.com/documents/528.pdf

Changes for NisOpt2011

Executable name and directory changes:

Executable name changes:

- Some program executable files will no longer carry a version number. Applications referencing one of these executables MUST be updated.
- nisbatch2008 will become nisbatch
- run02008 will become run0
- runlib2008 will become runlib

Directory structure will change:

- There will be some slight changes to the directory structure. Files within these directories should be saved to an alternative location and applications using the file path names MUST be updated.
- NisOpt2011 directory will be renamed NisOpt.
- Samples directory will be moved from the Northinfo directory to the NisOpt directory.
- Perf32 will now be Perf.

For further inquiries, contact Technical Support in Boston: **support@northinfo.com** or call 617.208.2080. European clients can contact: **support-europe@northinfo.com** or call +44 -(0)-20-7801-6222. In Asia, call +81(0)3 5403 4655 or +61 (0)2 9238 4284 or **support-asia@northinfo.com**.

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

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