Northfield News

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Risk and Asset Allocation Inclusive of Pension Funding, "Full" and Otherwise - *By Dan diBartolomeo*

In June 2012, the US-based Government Accounting Standards Board initiated new standards under which cities and states would account for their liabilities arising from defined benefit pension funds. Pressure has been mounting on GASB to take action as underfunding of public pension funds has been widely reported upon in the financial press. Under the new standards, units of government that have very underfunded pension plans will be required to disclose such conditions in their financial statements, and also limits the extent to which pension funds can value their assets as the *average market value* over some historic observation period, thereby "smoothing" any apparent mismatch between assets and liabilities.

The New York Times reported that under the new standard it is estimated that in aggregate the funding level of US public pension funds will fall from 57% to 43% by application of the revised standards. Several academic studies have suggested the real economic value of the underfunding is between $1 Trillion and $2.5 Trillion.

We would assert that the conventional view of defined benefit pension plans for both corporate and public entities is substantially flawed because there is an implicit assumption that the sponsoring entity will exist in perpetuity and is essentially immune from default. Every defined benefit pension scheme has an explicit guarantee of funding from the sponsoring organization. If the plan becomes underfunded by virtue of poor investment results, the sponsoring entity must increase cash contributions in future years to make up the shortfall.

One conceptual way to view this situation is to assume that a pension plan is always fully funded. Any underfunding in the balance between assets and liabilities is made up by an implicit asset which is similar to a perpetual call option on a bond from the sponsor. Under this framework, both the asset allocation and risk profile of a underfunded pension scheme is quite different from the conventional perspective, as a large portion of the fund is now concentrated in a bond-like security of a single issuer.

The economic value of the funding guarantee option depends on the actuarial and accounting standards relevant to a particular plan. There are key differences, such as the provisions of Financial Accounting Standards Board rule 87 between corporate and public sponsors and across countries. We'll now look at the magnitude of implicit guarantees needed to justify the aggressiveness level of typical defined-benefit plans.

One key aspect of defined-benefit plans that is often vague is exactly to whom the money in the pension plan belongs. The obvious answer is that the wealth of the plan belongs to the pension beneficiaries, but it's not that simple. The sponsoring entity is

Recent and Upcoming Events

2012 Northfield Annual Research Conference
The Grand Del Mar ● San Diego, California ● August 7-9, 2012

We are pleased to announce our 25th annual research conference at the Grand Del Mar, in San Diego, California. The conference will officially begin on Tuesday, August 7th and end on Thursday, August 9th.

The Grand del Mar is serenely nestled in a canyon preserve and seamlessly combines the old-world charm of a Mediterranean estate with the modern luxury of a elegant resort. The hotel offers the best of San Diego; beaches, zoo and military history while it incorporates all of its stunning surroundings! As is customary at Northfield events, a complete recreational and social calendar will accompany the working sessions. Northfield will be sponsoring a variety of activities for attendees on Tuesday morning including kayaking, golf, a tour of the U.S.S. Midway, jet skiing, admission to the San Diego Zoo Safari Park, or a photo caravan tour of the San Diego Zoo Safari Park.
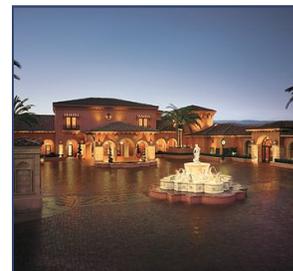
The Grand Del Mar

We are accepting online registrations only. To complete your online registration, hotel requirements, and to view the full agenda with detailed presentation abstracts, visit **http://www.northinfo.com/events.php.** All hotel reservations are to be made directly by calling the Grand Del Mar, 855-314-2030, or by visiting their website at **https://booking.ihotelier.com/istay/istay.jsp?groupID=809278&hotelID=74969.** The hotel reservation group code is NORT1012. Contact Kathy Prasad if you have any difficulties registering, **kathy@northinfo.com,** 617.208.2020.

Agenda
The agenda will consist of twelve 1-hour presentations.

Diversifying Risk Parity
Harald Lohre, DEKA Deka Investment GmbH

Diversification Return and Leveraged Portfolios
Eddie Qian, PanAgora Asset Management

A Structural Model of Sovereign Credit Risk
Emilian Belev, Northfield Information Services

Why Not Guaranteed Active Management?
Jason MacQueen, R-Squared Risk Management Ltd.

Downside Risk Management in Emerging Markets
Issam Strub, The Cambridge Strategy Ltd.

Federal Market Information Technology in the Post Flash Crash Era: Roles for Supercomputing
David Leinweber, Lawrence Berkeley National Laboratory

Mismanagement of Municipal Debt Puts a Hold in Everybody's Pocket
Andrew Kalotay, Andrew Kalotay Associates

Creating Dynamic Pre-Trade Models: Beyond the Black Box
Robert Kissell, Ph.D., UBS Portfolio Trading

Time Varying IC, Conditional Risk Model and Optimal Portfolio Turnover
Zhuanxin Ding, Analytic Investors

Macro Factors in Corporate Governance
Lloyd Kurtz, Nelson Capital

Quantitative Asset Management for Turbulent Markets
Michael Crouhy, Natixis

The Real Risk of Pension Funds: Funding Guarantees
Dan diBartolomeo, Northfield Information Services

Attilio Meucci's Advanced Risk and Portfolio Management Bootcamp
August 13-18, 2012 ● New York University ● New York City

This six-day bootcamp covers all aspects of quantitative risk and portfolio management from the foundations to the newest developments. Visit http://www.northinfo.com/events.php to register, and view the detailed information and agenda. There is a discounted Northfield partner rate available.

Northfield Asia Seminar Series – Research on Investment Management and Risk
Hong Kong ● Singapore ● Sydney ● Tokyo ● October 2012

Northfield will be hosting four one day seminars in Hong Kong, Singapore, Sydney, and Tokyo in late October. The purpose of the seminars is to showcase our research on various topics in investment and risk management to our growing list of Australian and Far East clients and prospects.

Further details will be posted to http://www.northinfo.com/events.php as the venues and agenda become finalized. Contact Nick Wade in Tokyo if you would like to attend, **+81 3 5403 4655** or e-mail: **nick@northinfo.com.**

2012 Newport Annual Summer Seminar Wrap-up
Tennis Hall of Fame ● Newport, Rhode Island ● June 8, 2012

Northfield's annual summer seminar took place at the International Tennis Hall of Fame, in Newport, RI on June 8th. The seminar presented recent research and technical advances to an audience of Northfield clients and friends.

The agenda consisted of five presentations including: "A Structural Model Of Sovereign Credit Risk," "Asset Allocation and Risk Assessment for Pension Schemes Inclusive of Funding Guarantees," "Optimal Growth Portfolio Construction and Effective Tail Risk Mitigation," "Risk Considerations for International Investors." and "Third Generation Northfield Risk Models."

Tennis Hall of Fame

As is customary, the seminar coincided with the USA Professional Championship of Court Tennis. Following the presentations, attendees viewed a court tennis demonstration by Northfield President Dan diBartolomeo, and then a Semi-Final Match between Tim Chisolm of the US and Bryn Sayres of the UK. Court Tennis, or "real tennis" is the medieval sport that is the progenitor of all modern racquet sports. Sayres won the match, but lost to Camden Riviere in 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. Northfield does not charge attendance for this event, however, we do accept donations on behalf of the Pine Street Inn, Boston's primary homeless shelter.

Online Workshop: How to Use the Northfield Optimizer in R and MATLAB® Wrap-up
April 3, 2012 ● 11:00 A.M., E.D.T.

Northfield's Peter Horne hosted an online workshop where he demonstrated the use of the Northfield Optimizer Service in the R and MATLAB® programming environments.

The presentation slides are available at http://www.northinfo.com/documents/499.pdf. Contact your Northfield Sales Representative if you are interested in viewing the full presentation recording of the event.

responsible for shortfalls so they have a large economic stake in investment performance. The better the investment performance the lower the expense of future contributions will be. This is good for shareholders, existing employees and in the case of public funds, tax payers. In rare cases, if the plan ends the sponsor may be able to recapture any surplus funds. On the other hand, The pensioners only concern about investment performance is that it not be so horrible that the sponsor is strained to the point of default on any additional funding obligations. There is no upside for the pensioners in good investment performance so perverse incentives are created wherein the beneficial owners of the pension assets are indifferent to the efficient management of the plan.

To meaningfully discuss pension funding we must first define the nature of the so-called pension liabilities. Broadly speaking, the term "Accumulated Benefit Obligation" is used to describe the present value of promised pension benefits assuming the plan was terminated immediately. The term "Pension Benefit Obligation" represents the present value of promised pension benefits assuming the plan is ongoing and current employees continue to receive pay increases at an assumed rate until normal retirement. The future promised pensioner payments included in ABO and PBO are discounted to present value using a selected discount rate. For US public plans and for all plans in most countries the discount rate is the assumed rate of return on investment for the plan assets. Most corporate plans in the US and a few other countries FASB 87 which specifies that the yield on high quality corporate bonds be used and is subject to periodic reset. Multiple discount rates conforming to an observable yield curve are rarely used as discussed in diBartolomeo (2011).

From an asset management perspective one can take the simplistic view that running a defined benefit pension scheme is just being long a diverse set of assets (equities, diverse fixed interest, property) and being short a portfolio of purportedly risk-free fixed interest securities (i.e. bonds). One might ask, i*f the plan is supposed to be riskless to the pensioners, why not discount the liabilities at risk free yields?* The usual reasoning given for not discounting at riskless rates is that it is *assumed* that the sponsor will continue to exist to act as a guarantor of the benefit payments through additional contributions if needed. Discounting at the *expected* return on assets makes volatility of annual contributions smaller which is helpful for operational planning of the sponsor. This is fine as long as the amount of additional benefit payments potentially required are not too large for the sponsor to handle, or the sponsor is not subject to bankruptcy risk for reasons unrelated to the pension. Secondary guarantors may also exist. In the UK there are private pension insurers (e.g. Brighton Rock).

For US corporate plans there is the Pension Benefit Guarantee Corporation, an FDIC like entity that guarantees 80% of corporate plan benefits.

Most US corporate plans subject to FASB 87 are in relatively "OK" shape. Corporate treasurers have been very averse to showing pension deficits on their balance sheets as required by these rules. Oddly, the big economic risk for these plans is if credit market conditions improve. Government bond yields in many countries are close to all time low values. If credit spreads decline, corporate bond yields will also drop closer to government bond yields, resulting in a decrease in the pension liability discount rate which in turn will increase the present value of the liabilities.

In Europe, the picture is mixed. Many large European funds (e.g. ABP) appear to be in good condition by virtue of having always had low asset return assumptions. However, underfunding of defined benefit pensions similar to the situation in US public funds has been widely reported in the UK press. Most sovereign government pension schemes are mostly "pay as you go" and many have run into severe difficulty (e.g. Greece) where massive borrowing has been required to meet benefits. A few countries such as Canada have partially funded national schemes.

Perhaps the greatest problem of defined benefit plans is a semantic one regarding the meaning of a "Fully Funded" plan. Many people *believe* that if a plan is in "fully funded" status it will not require unexpected additional contributions from the sponsor. For most plans where the liability discount rate is the expected rate of return on assets, there is a 50% chance that the realized investment returns will be less than assumed, so there is a 50% probability that additional funding of some size from the sponsor will be needed. For FASB 87 compliant plans, the probability of needing additional sponsor funding is less but can still be substantial depending on the volatility of the asset portfolio, the volatility of bond yields and the duration of the liability payment streams. For underfunded plans, the dependence on additional contributions from the sponsor is obvious, and any potential for default on the additional funding needed by the plan sponsor is a real risk to pension beneficiaries.

To address the confusion, we can use an alternative view of pension funding. We can assume every defined benefit pension scheme has sufficient asset value at all times such that the probability of not meeting a required payment is nil. A significant part of the asset portfolio is a implicit asset which is a portfolio of call options on bonds (i.e. a fixed stream of cash flows) from the sponsoring entity. The value of this implicit asset must not only be large enough to bring the plan to full funding, but be large

enough to bring the plan to a *sufficient surplus as to virtually guarantee all obligations.* Oddly, if a pension fund were actually funded to this level of surplus, it would be subject to tax penalties in some countries (e.g. USA).

Under this framework, the typical pension asset portfolio is quite different than in the conventional view. Since the implicit asset is a call option on securities of a single issuer, the degree of issuer specific risk is often very large. In addition, the plan asset allocation is shifted radically away from equities toward fixed income.

Let us consider a stylized example. We will assume we have a "fully funded" pension scheme that is 50% invested in the FTSE All World Index denominated in US$ and 50% in FTSE 15+ Maturity UK Gilt Index. We will set expected returns are 9% and 7% respectively. Based on long term return history, the volatilities are 15.88% and 11.34% respectively with a historic correlation is .18. Our liabilities will be presumed to be level payment outflows over a 25 year horizon.

The portfolio expected return is 8% with a volatility of 10.55%. We know the likelihood of realizing 8% is 50%. To be consistent with the commonly taken implication of the term "full funding" we will require a 99% chance of meeting our return target over a 25 year horizon. To achieve such a probability, we have to go all the way down to 3% for our assumed rate of return. If we discounted our liabilities at 3% instead of 8%, we would be far below full funding, but instead would need to have a 62.27% surplus that is the difference is the value of the implicit call option on additional funding from the sponsor.

Our portfolio now consists of 50 units of FTSE equity, 50 units of FTSE fixed income (gilts) and 62.27 units of value in the implied call option on a bond from the sponsor. Our asset allocation has shifted to 30.8% equity, 30.8% conventional fixed income and 38.4% implicit fixed income. The question before us is whether it is *prudent to put 38.4% of a large pension scheme into a call option on the bonds of a single issuer?*

Also by having the equivalent of 62.2% of our current portfolio market value in the single-issuer implicit asset we are taking on some specific risk. Let's assume that our plan sponsor is Ford. In Northfield's model, our current estimate of specific variance for the average Ford bond is 19.5%[2]. The additional variance added to the portfolio is about 7.5 units, so our portfolio volatility increases by a modest amount from 10.55% to 10.89%. The increased volatility is equivalent to a 4 basis point decrease in the compound annual growth rate, and a 12 basis point decrease in investor utility (risk adjusted return). For a fully funded plan with a creditworthy issuer, the increase in risk

to the pension portfolio seems small but is still enough to meaningfully impact the plan.

How about an underfunded plan? Let's consider the same case but with the plan only 70% funded. We still need to have a 62% surplus given the volatility of the portfolio and our capital market expectations. Our implicit asset now makes up the difference between 70% funding and 162% funding. The additional specific risk is now 16.5 units and our portfolio volatility estimate has increased about one percentage point to 11.58%. The equivalent loss of compound growth rate is now 11 basis points and the loss of investor utility is around 40 basis points per annum. For underfunded plans the increased risk associated with the specific risk of sponsor guarantees is definitely economically material.

Sponsors in this unhappy position might be tempted to try to improve the problem by taking a more aggressive investment asset allocation. Let's assume we started with a 70% allocation to equities and a 30% allocation to fixed income. The expected return for the fund is now up to 8.40%, while the volatility of the fund is up to 12.19%. With the higher expected return, our plan is now about 103% funded. As both the mean and standard deviation of the return distribution have increased, the tail probabilities don't change very much. Over the 25 year horizon, we still need to have a discount rate down around 3% per annum to make the probability of requiring sponsor funding less than 1%. This simple illustration suggests that sponsors cannot substantially reduce the economic value of the implicit guarantees by taking a more aggressive investment posture to increase the expected returns.

Another way to think about this issue is the "Discretionary Wealth Hypothesis" (DWH) as provided by Wilcox (2003). Under this theory, the optimal value for an investor's mean variance risk aversion (aka lambda in mean-variance analysis) is related to the ratio of total assets to surplus (assets minus liabilities). The optimal value for lambda is L/2 where L is the ratio of total assets to surplus.

If we believe our asset allocation is mean variance efficient we can calculate the tangency slope as lambda. Once we have lambda we can use the Wilcox formulation to solve for the percentage of surplus required to justify the lambda value. The difference between the current funding ratio and the ratio with the required surplus is the value of the guarantee. Using this approach, the resultant required surpluses are results are consistent with the previous example.

If we accept that a large part of a plan's assets are the implicit call on cash from the issuer, we must also consider the potential for an actual default. At Northfield, our ap-

proach to the credit risk of a corporate bond (or counterparty) is to decompose the corporate bond into a riskless bond and equity of the issuer. This analysis is done using a combination of equity risk models and "contingent claims" structural credit risk methods as in Merton (1974). Most details of the process are described in diBartolomeo (2010). The *approximate* portion of a corporate bond's value that is allocated to equity is:

$$(-(T-B)/B) * (D_p / D_c)$$

T = the value of the bond if it were riskless

B = the market value of the bond

D_p = the delta of the shareholder put option

D_c = the delta of the shareholder call option

If a corporate plan sponsor has traded bonds we can use the allocation method to describe two key attributes, Probability of Default (PD) and Loss Given Default (LGD). The expected loss of value given default (LGD) is simply the portion of the value of the obligation that is allocated to equity in the issuing firm.

Given the yield on the traded bonds of the firm, we can estimate an "option-adjusted spread" (OAS), the portion of a bond's yield that is attributed to credit risk. If we have both LGD and OAS, we can estimate the probability of default (PD) either assuming risk-neutrality or any particular level of risk aversion. Again we can invoke the DWH on bond data to estimate a reasonable risk aversion for the aggregate bond market.

A similar analysis may be invoked to estimated sovereign sponsor default risk. "Pay as you go" plans are normally prevented from defaulting by new taxes or currency devaluation. The difference between the current Eurozone crisis and the Russian currency devaluation in 1998 is that the old age pensions of Russian citizens were essentially wiped out through a large currency devaluation while the constraints of the Euro prevent such a simple, if painful, solution to the current Eurozone crisis over Greek sovereign debt.

In the near future, Northfield will be releasing to clients a new analysis approach to sovereign debt similar to our approach to corporate debt. In this new method, we extend the work of Bodie, Gray and Merton (2007). We estimate the total assets of a country as the present value of projected GDP (like a dividend discount model). National debt includes issued debt, aggregate unfunded pension liability and a reserve for bank "bailouts."

If there was one lesson that should be learned in the financial crisis it was that "too big to fail" is real. The financial stability of national governments and the stability of the banking system is inextricably linked. We've modeled government securities are part of the "financial sector" since 1999. Despite much coverage in the financial press, the US is relatively low on the scale of bank vulnerability. Economist Simon Johnson recently reported in a public address that the "systemic risk banks" in the US have total assets of 65% of GDP, while the comparable figures are France - 249%, UK - 337%, and Switzerland - 550%. When we add unfunded pension liabilities to the potential requirements of ongoing banking system bailouts, these figures grow to ever more distressing magnitudes.

In conclusion, we would argue that the guarantee of additional funding if required is a key ingredient to every defined benefit pension scheme. Many pension funds around the world are substantially underfunded to an aggregate of many trillions of dollars. Conventional views of fund asset allocation and fund risk levels ignore the economic value of the funding guarantee. We prefer to formulate the problem as having all funds funded to an appropriate level of surplus at all times, with the an implicit asset that is a call option on a bond of the sponsoring firm. For typical pension funds, the degree of implicit surplus required is material to asset allocation decisions and fund risk assessments

References

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Merton, R.C. (1974). "On the pricing of corporate debt: The risk structure of interest rates", *Journal of Finance*, Volume 29, 449-470.

diBartolomeo, Dan. "Equity Risk, Default Risk, Default Correlation and Corporate Sustainability", *Journal of Investing*, December 2010.

Bodie, Zvi, Dale F. Gray and Robert Merton (2007) "New Framework for Measuring and Managing Macrofinancial Risk and Financial Stability", NBER Working Paper.

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

Tech Support Tip: Nested Composites
By Mike Knezevich

In analyzing portfolios, clients may encounter assets whose characteristics are derived from another underlying constituent(s). Such assets may include ETFs, mutual funds, fund of funds, and options. To accurately account for the risk of these types of assets, we need to account for not only the risk characteristics of the aggregated composite asset, but also the relationship between the constituent assets and portfolio holdings.

Line-item asset exposure:

Frequently when clients hold these more complicated composite assets, they simply want to add a one-line entry of the composite asset's exposures to the exposure files. This method could, however, misrepresent the actual risk of the portfolio. Let's say we have two assets that are exactly the same. For example an asset which is a complete replicate asset of Apple where everything is exactly the same. Let's call this asset AAPL2:

ID	Name	Price($)	Resid	BETA	E/P	B/P	Cap	IND	Total Risk
AAPL	Apple	599.95	44.51	1.22	0.27	-0.53	3.8	CPU	56.6978
AAPL2	Apple	599.95	44.51	1.22	0.27	-0.53	3.8	CPU	56.6978

Constructing a portfolio containing only AAPL2 versus a benchmark composed only of AAPL and comparing the risk breakdown will illustrate that these assets are not exact:

	Initial	
	Return	Risk(v)
Factor	0.00	0.00
Stock Specific	0.00	3962.94
Total	0.00	3962.94

Tracking Error	62.95

Portfolio Utility	-39.63

Explanation:
- Since factor exposure for these assets is exactly the same, there is no factor risk as illustrated in the risk breakdown.

- However, there is nothing to link these assets so they are treated as different assets with distinct stock specific risk. This is exemplified by the non-zero Stock Specific risk.

Composite asset:

A composite asset is used to aggregate the underlying constituent assets into a single entity, treating the entity like a single asset within the Optimizer while retaining a link between the stock specific risk of the underlying assets and portfolio holdings. The next example consists of a composite asset containing only AAPL versus an AAPL-only benchmark.

Initial Portfolio

	Factor	PortExp	BenchExp	ActiveExp	FactorVar	VarContr
1	Beta	1.2200	1.2200	0.0000	489.8900	0.0000
2	Earnings/Price	0.2700	0.2700	0.0000	2.9238	0.0000
3	Book/Price	-0.5300	-0.5300	0.0000	15.6414	0.0000
4	Dividend Yield	-0.7000	-0.7000	0.0000	4.8966	0.0000

Factor Tracking Variance	0.0000
Stock Specific Tracking Variance	0.0000
Total Tracking Variance	0.0000
Tracking Error	0.0000
Total Risk of Portfolio	56.6978
Total Risk of Benchmark	56.6978
R-Squared	1.0000

Explanation:
- Again, factor exposures are completely identical, hence 0 factor risk.

- However, in the case of the composite asset, stock specific risk is linked to the underlying asset. Complete replication is achieved.

Nested composites:

As portfolios hold different investment types, such as a mutual fund holding an ETF which holds an option on an index, risk decomposition becomes increasingly more complex with intertwined asset holdings. Nesting composites ensures that asset risk is correctly accounted for.

Let's illustrate this with an example. Say a portfolio exists that is an equally weighted combination of the AAPL composite asset with an additional stock holding of ABT, which trades as a single entity. Let's call this new entity Composite 2 (comp2).

	ID	Percent
1	ABT	50.0000
2	AAPL_C	50.0000

The characteristics of comp2 are based on the equal weighted exposures of the underlying assets ABT and the AAPL composite.

Further assume another portfolio exists where comp2 is being held equally weighted with AA.

	ID	Percent
1	AA	50.0000
2	Comp2	50.0000

Effectively, a portfolio has been constructed of a composite within a composite within another composite, mirroring that of the intertwined example above yet much more simplistic.

Comparing this portfolio to an appropriate benchmark can determine if the risk is being accounted for correctly. Such a benchmark would contain the assets in the same proportions as that of the portfolio and is constructed from the underlying composite weightings. For example, since ABT is 50% of comp2 and comp2 is 50% of the portfolio, the benchmark would contain 25% of ABT.

	A	B	C	D	E
1	ID	Name	CA:1	CA:2	CA:3
2	*$$$	CASH	0	0	0
3	AA	Alcoa Inc.	0	0	50
4	AAPL	Apple Inc.	100	50	25
5	ABT	Abbott Laboratories	0	50	25
6	AAPL_C	Composite of Apple	0	0	0
7	Comp2	Composite Two	0	0	0
8	Comp1	Composite One	0	0	0

Applying the same calculations to all the constituent asset, the benchmark holdings are:

	ID	Percent
1	AA	50.0000
2	ABT	25.000
3	AAPL	25.000

Comparing the composite portfolio to the benchmark we see no tracking error exists:

Optimization Summary

	Initial		Optimal	
	Return	Risk(v)	Return	Risk(v)
Factor	0.00	0.00	0.00	0.00
Stock Specific	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00

Tracking Error	0.00	0.00

Portfolio Utility	0.00	0.00

The underlying assets in the composites have been linked to those assets within the benchmark ensuring the risk is accounted for correctly. Tracking error - both factor and stock specific - has been accounted for in all the layers of the composite portfolio which is the desired outcome of the nested composites.

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Staff Speaking Engagements

Northfield President Dan dibartolomeo will be presenting at the July 11, CFA Society of Sao Paulo (Brazil) meeting. The topic will be: Chasing Bernie Madoff: An Analytical History

On the following day, Dan will be making the same presentation to a joint meeting of various Brazilian government agencies that regulate financial markets.