INVESTMENT RISK & ANALYTICAL SERVICES QUARTERLY DIGEST

While we're still very much in the midst of the COVID-19 crisis, 2021 offers potential light at the end of the tunnel. Imbued with this spirit of goodwill, the first IRAS Digest of 2021 delivers a multitude of interesting and topical insights.

We start with a couple of IRAS updates, firstly a timely reminder that the transition away from LIBOR will be happening throughout 2021 and that we are here to assist you however we can. We follow this with an Environmental, Social and Governance (ESG) Investment update, outlining the current IRAS services provided by the Investment Risk and Post-Trade Compliance teams.

Next up we discuss equity protection, a subject of growing importance and popularity among our clients, especially given the volatility of last year. Part 1 covers the types of strategies available whereas part 2 gets more technical, helping to explain how we account for such strategies and derivatives in performance.

IN THIS EDITION

Our next article is on credit rating agencies. Familiar to most fixed income investors, they provide a valuable role in functioning credit markets. But experience has taught us that relying too heavily on ratings alone can be problematic. This article provides an understanding of how agencies determine their ratings and what they mean, as well as their potential shortcomings.

Our next article comes from the Post-Trade Compliance team, exploring how the IRAS offering has evolved to include ESG and SRI principles, allowing clients to identify and monitor breaches through Compliance RADAR. Closing this edition is our regular round-up from around the various IRAS teams, including updates from the Private Monitor and Investment Risk teams.

IRAS UPDATES: PERFORMANCE - THE TRANSITION AWAY FROM LIBOR

By Scott Douglas, Manager, Investment Performance, EMEA

Towards the end of 2021, the Financial Conduct Authority (FCA) will no longer compel panel banks to make London Inter-bank offered rates (LIBOR) submissions. Our industry is moving away from using inter-bank offered rates (IBOR) as reference rates and will switch to alternative risk-free rates for a wide range of financial products, including the benchmarks we commonly use in investment performance measurement.

Read this Northern Trust summary of what is happening, as well as the work Northern Trust is undertaking to prepare for the change.

Northern Trust has implemented a number of internal workstreams to evaluate LIBOR exposure in the products and services currently offered to clients. For clients that subscribe to Investment Risk and Analytical Services (IRAS), your designated IRAS consultant will be discussing the impact that this transition will have with respect to any benchmarks that are currently being used.

We have developed a number of RADAR exhibits to compare the alternatives to LIBOR that are being discussed across the industry, examples of these include Sterling overnight index average (SONIA), Secured overnight financing rate (SOFR) and Euro short-term rate (€STR).

If you have any questions or would like to discuss, please do not hesitate your designated IRAS Consultant or:

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IRAS UPDATES: ESG SERVICES

Within Northern Trust's IRAS group, we currently offer two solutions to assist our clients in measuring and monitoring their ESG exposures. These ESG capabilities allow clients to enhance their investment process, improve engagement, promote solid environmental credentials and manage reputational risk.

Within our post-trade Compliance Monitoring service, we offer a screening service to identify breaches to a client's mandated instructions through flagging investments in companies that derive revenue from potentially restricted areas. We support wide-ranging restrictions and sanctions on a company's involvement in certain industries. Categories include alcohol, firearms, labour practices, tobacco, weapons production and a range of country sanctions.

In addition our ESG reporting service that offers a quantitative approach to measuring environmental, social and governance in collaboration with a third party data vendor (IdealRatings). Clients can analyse their ESG credentials relative to a chosen benchmark at a total plan as well as manager level. Details are available for the largest contributors to allow for engagement with investment managers and help manage any potential reputational risk.

If you would like additional information on IRAS ESG services as well as IRAS Investment Risk Services and IRAS Post-Trade Compliance services, please contact:

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EQUITY PROTECTION STRATEGIES - *PART 1: CHOOSING A SUITABLE STRATEGY*

By Niraj Sharma, Associate Consultant, Investment Performance

Derivatives-based overlay strategies to protect against equity losses have become increasingly popular over the past 2 years among pension funds, endowments and other asset owners. Investors are seeking more explicit forms of protection, especially given volatility of last year. Although market shocks such as COVID-19 are largely unpredictable, prevailing risks such as recession, weaker corporate earnings and the eventual tightening of monetary policy may be more inevitable.

While many sophisticated investors have spent the past decade building up their "implicit" downside protection in the form of diversifying strategies, the prospect of severe downturns can strengthen the case for more "explicit" safeguards on investment portfolios.

Investors' motives for applying equity overlays are rather different. Some simply have low tolerance for losses, regardless of the investment horizon or funding ratio; some face high immediate liabilities relative to inflows, such that losses cannot be handled easily; some are acting purely based on technical considerations, such as the need to protect committed capital for future investments.

Whatever the driver, the decision to apply a more explicit risk control approach involves a number of choices. Some of these are relatively complex, not just from a technical standpoint but also from the perspective of governance and stakeholder buy-in. These can include the decision to use single-period versus multi-period overlays, the degree of customisation, where to place caps in terms of both upside participation and downside losses, how to handle margin requirements and much more.

Types of Strategy

Strategies in this field broadly fall into one of three categories: Static, Evolving Static and Dynamic (see Figure 1 overleaf).

- The Static approach in this case would be a "set-and-forget" strategy;
- Evolving Static would be a sub-division into shorter periods (e.g. three six-month structures)
- Dynamic approach would involve active trading throughout the period.

Figure 1:

STATIC	EVOLVING STATIC	DYNAMIC
Protection level is decided upon at the outset, cost is driven by the implied volatility in the market at that time and the intention is to hold the option structure until maturity. Transparent, simple and implemented fairly quickly. Sensitive to timing ("pin risk"): there is less flexibility if the market moves in the opposite direction.	Similar to static overlays but, should market dynamics change over time, the manager will adjust the hedge accordingly and establish a new option position. Example: three six-month collars rather than one eighteen-month collar. Less sensitive to inception date but more vulnerable to path-dependency.	A series of overlapping option positions to create a more complex solution. Less sensitive to inception date: protection levels evolve with the market. Less transparent in terms of where the protection level actually is. Greater complexity entails higher costs.

Source: Bfinance, January 2019

Pension funds and similar entities tend to prefer more intuitive approaches, but most wish to retain some degree of flexibility in theory: it can be helpful to know that the manager has a range of tools in the toolkit and the ability to use them if appropriate.

Equity protection strategies offer a simple way for investors who want to maintain equity exposures and mitigate against the most severe declines. When choosing between strategies, scenario testing is a good way to examine the potential payoffs and losses in a tangible way. IRAS Risk Services offer a comprehensive scenario analysis and portfolio stress testing service. Stress testing demonstrates the effect of various market scenarios or simulated shock factors on your portfolio. Barra One has a set of pre-defined historical scenarios, where users can define their own shock types including equity, interest rate, foreign exchange, credit spreads or commodity shock scenarios.

Six key questions for consideration

1. **How long should the protection last for?** Depending on the purpose of hedging and the cost of appropriate options at the time of implementation, it could make sense to apply a put-spread collar for any period of time between one and three months and one and three years.

2. **How much manager discretion would be tolerated?** A static approach would be a 'set-and-forget' strategy; evolving static would be a sub-division into shorter periods, and a dynamic approach would involve active trading throughout the period.

3. **What costs am I willing to bear?**

4. **Where do we want to place the strikes?** This is a question of how much upside participation to give up and how much downside protection to implement.

5. **How should collateral be treated?**

6. **How closely should the protection match my portfolio?**

In summary, equity protection – much like any hedging strategy – has many factors to consider. However, protecting a portfolio from large fluctuations (outlier events), such as market crashes (such as that of March 2020 caused by the COVID-19 pandemic for example), deserves careful consideration. Not all strategies will suit the existing tolerance for risk and may require the sacrifice of some upside potential, but putting at least some protection in place could help to preserve the principal.

References:

- Bfinance - DNA of a Manager Search: Equity Overlay, Schroders, https://ebrary.net/ January 2019.

EQUITY PROTECTION STRATEGIES - *PART 2: MEASURING PERFORMANCE*

By Philip Norton, Senior Consultant, Investment Performance

Now we have learned a little about the types of strategies that can be employed, how do we then incorporate this into our performance reporting?

If we just measured the derivative contract as a whole, the market value is the net of both the purchase and the sale, which would be zero or close to zero. The change in the market value or the mark-to-market is the gain/loss of the contract. When utilising standard performance methodology, more often than not, the gain/loss as a percentage of a small (potentially negative) value or even zero, would either be incalculable or lead to a highly skewed return.

Table 1 - Derivative Contracts

	Start Value	Flows	End Value	Gain/Loss	Return
Equity Derivatives	9,962,541.24	0.00	5,717,752.54	-4,244,788.70	-42.61

Source: Northern Trust. For illustrative purposes only.

When combined with other investments/accounts, the impact of the gain/loss on the overlay would be included in the higher level return. Although, the market value is not really reflective of the exposure which effects the group level return.

Table 2 - Derivatives combined with Equity

	Start Value	Flows	End Value	Gain/Loss	Return
Equity Derivatives	9,962,541.24	0.00	5,717,752.54	-4,244,788.70	-42.61
Common Stock	636,665,867.26	4,649,519.44	630,201,917.16	-11,113,469.54	-1.74
Total Equity	646,628,408.50	4,649,519.44	635,919,669.70	-15,358,258.24	-2.37

Source: Northern Trust. For illustrative purposes only.

So to see more meaningful performance and the notional exposure, we can 'explode' a single contract into the asset leg and an offset leg (often called the cash or financing leg). The market value of the asset leg would show the total exposure (price multiplied by number of shares), while the daily return would reflect the change in the price of the derivative.

Then the offset leg has an equal and opposite market value to the asset leg. The IRAS performance system also adds a daily offsetting value, which ensures the local return of the offset leg remains zero. If the base and local currencies are different, the base return will just reflect the movement of that currency. The mark-to-market is posted into the relevant cash holding. The asset leg will then have a contribution, as it has a weight and return, whereas the offset leg will have a zero contribution, as there would be a 0% return at local level (unless the derivative is denominated in non-base currency).

Table 3 - Derivative Contracts split into Legs

	Start Value	Flows	End Value	Gain/Loss	Return
Asset Leg	172,195,112.86	-34,079.86	167,950,324.16	-4,210,708.84	-2.45
Offset Leg	-162,232,571.62	34,079.86	-162,232,571.62	-34,079.86	0.02

Source: Northern Trust. For illustrative purposes only.

By separating the contract into legs we are able to attribute each leg to the correct asset class, which combines the asset leg with the equity and the offset leg with cash. This means the correct exposure is seen in each category and the gain/loss of the equity derivative rolls into the equity asset class.

Table 4 - Asset Leg combined with Equity

	Start Value	Flows	End Value	Gain/Loss	Return
Asset Leg	172,195,112.86	-34,079.86	167,950,324.16	-4,210,708.84	-2.45
Common Stock	636,665,867.26	4,649,519.44	630,201,917.16	-11,113,469.54	-1.74
Total Equity	808,860,980.12	4,615,439.58	798,152,241.32	-15,324,178.38	-1.89

Source: Northern Trust. For illustrative purposes only.

This then allows us to utilise asset class or regional reporting.

Figure 1:

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Regional Performance

Category - Base Rates of Return	Ending Market value GBP - GOF	Ending Weight	One Month Portfolio	One Month Index	One Month Excess
Demo Pension Fund	5,538,791,029	100.00	-0.05	-0.14	0.10
Total Fund - Foreign Exchange	5,550,458,807	100.21	0.61	-0.14	0.76
Fixed Income	3,583,749,420	64.70	0.25	0.38	-0.12
Equity	798,152,241	14.41	-1.89	-2.46	0.57
Common Stock	630,201,917	11.38	-1.74	-2.46	0.72
Equity Derivatives	167,950,324	3.03	-2.45	-	-
Real Estate	1,230,533,038	22.22	0.25	0.27	-0.02
Private Equity	378,970	0.01	42.36	0.03	42.33
Cash & Synthetic Cash	-62,354,863	-1.13	-2.11	0.03	-2.14
Cash	18,071,086	0.32	-0.04	-	-
Short Term Bonds	81,806,623	1.48	0.36	-	-
Derivatives Offset	-162,232,572	-2.93	0.02	-	-
Foreign Exchange	-11,667,778	-0.21	-	-	-

Source: Northern Trust. For illustrative purposes only. This is not a recommendation to buy, sell or hold securities in a particular asset class.

However, in the Investment Hierarchy structure, the overlay account would still just be the net of the derivative contracts and wherever placed in the structure, the market values would not reflect the correct notional exposure. Here we can adjust for this by splitting the account into two separate performance-only sub-accounts; with the asset leg in one split account and the offset leg in the other. Now these can be positioned where required in the structure, the asset split account with the other equity accounts and the offset split account within the cash group. In this way we can see the notional exposures in the market values in this analysis.

Figure 2:

NORTHERN TRUST

Investment Hierarchy

Account/Group -% Rate of Return	Ending Market Value GBP	Ending Weight	One Month Port	One Month Index	One Month Excess
Demo Pension Fund	5,538,791,029	100.00	-0.05	-0.14	0.10
Demo Total Fund BM					
Total Fixed Income	2,176,328,177	39.29	0.26	0.38	-0.11
Total FI Benchmark					
Domestic Fixed Income	970,327,905	17.52	0.31	0.38	-0.07
Domestic FI Benchmark					
Global Fixed Income	422,055,092	7.62	0.49	0.37	0.12
Global Fixed Income BM					
Money Market	783,945,180	14.15	0.10	0.03	0.07
Money Market BM					
Cash & Financing Legs	-162,232,572	-2.93	0.02	-	-
Money Market Fund	946,177,752	17.08	0.09	0.03	0.06
Money Market BM					
Total Equity	798,152,241	14.41	-1.89	-2.46	0.57
Equity Benchmark					
Derivative Exposure	167,950,324	3.03	-2.45	-	-
Total Equity ex Derivatives	630,201,917	11.38	-1.74	-2.46	0.72
Liability Driven Investments	1,333,384,640	24.07	0.27	0.11	0.16
LDI Benchmark					
Real Estate	1,230,533,038	22.22	0.25	0.27	-0.02
RE Benchmark					
Private Equity	392,932	0.01	40.25	0.03	40.22
PE Benchmark					

Source: Northern Trust. For illustrative purposes only. This is not a recommendation to buy, sell or hold securities in a particular asset class.

Figures 1 and 2 are taken from the standard monthly reporting that IRAS can provide, but the same information is available through our online performance tool, RADAR. If you currently employ an overlay strategy or are looking to implement one, please speak with your IRAS representative to discuss your options.

Do you have feedback or suggestions for future editions? If so, we'd love to hear from you, please @click here ***to leave comments.***

CREDIT RATING AGENCIES

By Shiva S, Consultant, Investment Performance

A credit rating agency is a company that assigns credit ratings which evaluate a debtor's ability to pay its debt by making timely principal and interest payments. They specialise in providing opinions about the credit quality of bonds and of their issuers. A high credit rating indicates that the issuer has a high probability of making all future payments of principal and interest when due.

The debt instruments rated by such agencies include government bonds, corporate bonds, CDs, municipal bonds, preferred stock, and collateralized securities, such as mortgage-backed securities and collateralized debt obligations. The issuers of such debt instruments may be companies, special purpose entities, state or local governments, non-profit organizations, or sovereign nations.

A credit rating facilitates the trading of securities on a secondary market. It affects the interest rate that a security pays out, with higher ratings leading to lower interest rates. Credit rating is a highly concentrated industry, with the "Big Three" credit rating agencies listed below:

- Moody's Investors Service
- Standard & Poor's (S&P)

Together control 80% of the global market

- Fitch Ratings.

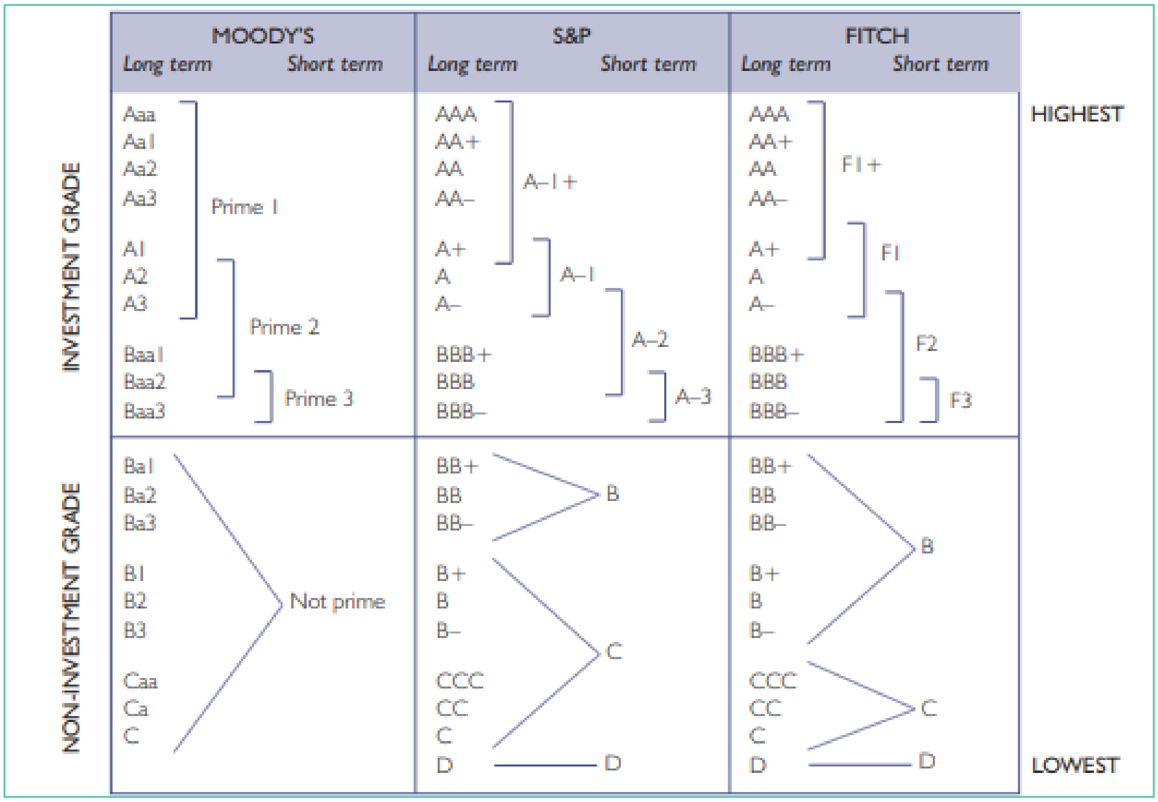
Standard & Poor's (S&P) and Moody's are widely used for both regulatory and investment purposes, while both agencies have equivalent rating grades (ranging from AAA to D for Standard & Poor's and Aaa to C for Moody's). Although most investors/regulators/analysts treat these ratings as the same, there are subtle differences in what the credit ratings for each agency measures:

- S&P ratings seek to measure only the probability of default. Nothing else matters — not the time that the issuer is likely to remain in default, not the expected way in which the default will be resolved. Most importantly, S&P simply doesn't consider what the recovery value is (the amount of money that investors end up with after the issuer has defaulted).

- Moody's, by contrast, is interested not in default probability per se, but rather expected losses. Default probability is part of the total expected loss — but then you have to also take into account what's likely to happen if and when a default occurs.

A credit rating expresses the likelihood of default within a given time horizon. In general, a time horizon of one year or under is considered short term, and anything above that is considered long term. In the past, institutional investors preferred to consider long-term ratings. Nowadays, short-term ratings are more commonly used.

Figure 1: Ratings and their Meaning (Long and Short-Term)



Source: The Association of Corporate Treasurers

Credit agencies rate both specific issues and issuer. An issuer rating generally indicates the likelihood that a company may default with regard to all its financial obligations. An issue rating, however, is based on a blend of default risk and the priority of a creditor's claim in bankruptcy associated with the specific debt being rated.

Rating methodology

The rating agencies use similar methodologies in arriving at their credit rating determination, but in general, their analysis will focus on two broad areas:

- **Business risk**: evaluation of strengths/weaknesses of the operations of the entity, including: market position, geographic diversification, sector strengths or weaknesses, market cyclicality, and competitive dynamics. This approach allows businesses to be compared against each other and relative strength/weakness to be identified.

- **Financial risk**: evaluation of the financial flexibility of the entity, including: total sales and profitability measures, margins, growth expectations, liquidity, funding diversity and financial forecasts. At the heart of this analysis is credit ratio analysis, which is used to quantitatively position companies of similar business risk against each other.

Criticism of Credit Rating Agencies during the 2008 Financial Crisis

Most credit rating agencies do not charge investors for their ratings, although they may charge them for the detailed reports on which the ratings are based. Instead, companies pay credit rating agencies to rate their securities and they are willing to do so because having a rating generally makes a security more marketable.

An obvious conflict of interest thus arises because companies are likely to direct their business to those credit rating agencies that will provide higher ratings. Equally, the credit ratings agencies may give companies high ratings to secure future business. However, if they lose their independence, credit rating agencies run the risk that investors may no longer respect their ratings. Such a situation would have a negative effect not only on credit rating agencies but also on the economy in general and could undermine confidence and trust within the investment industry.

During the 2008 financial crisis, it was widely reported that subprime, low quality mortgage-related securities were given AAA ratings: the highest and safest investment grade. When underlying mortgage holders were unable to keep up their payments leading to extensive mortgage forecloses, these AAA securities began to fail. The domino effect of these widespread defaults was generally accepted to be a key contributor to the onset of the global financial crisis. Some blamed the credit ratings agencies for conflicts of interest and perceived flawed methodologies and in 2017 Moody's agreed to pay nearly $864m to settle with US federal and state authorities over its ratings of risky mortgage securities in the run-up to the 2008 financial crisis. S&P Global's Standard & Poor's entered into a similar accord in 2015 paying out $1.375bn. But while credit ratings agencies were criticised for their shortcomings, investors were also blamed for over-relying on the ratings and not performing further research of their own on potential bond issuers.

If you would like to review the credit ratings on your investments, Northern Trust's online performance tool, RADAR, has the capability to retrieve credit ratings and characteristics data at both account / investment manager level and at holdings level, as depicted in the screen print below.

Figure 3: Account Level Credit Ratings in RADAR

NORTHERN TRUST RADAR

Fixed Income Characteristics — Demo Fund EMEA — Oct 2020

Global Fixed Income Manager — Nov 2020

Fixed Income Characteristics

Group/Account	Mod. Dur.	Years to Maturity	Moody	S&P
Global Fixed Income Manager	5.53	7.84	Baa1	BBB+

Source: RADAR

Figure 4: Holdings Level Credit Ratings in RADAR

RADAR

Demo Fund EMEA — Oct 2020

Global Fixed Income Manager — Oct 2020

Holdings List

Group/Account	Eff. Dur.	Mod. Dur.	Years to Maturity	Moody	S&P
Global Fixed Income Manager	5.43	5.53	7.84	Baa1	BBB+
ABBVIE INC 2.125% 06-01-2029	7.60	7.60	8.51	Baa2	BBB+
ABBVIE INC FIXED 4.5% DUE 05-14-2035	10.93	11.11	14.46	Baa2	BBB+
AMAZON COM INC FIXED 3.875% DUE 08-22-2037	12.62	12.78	16.74	A2	AA-
AMERICAN INTL GROUP INC 4.25% DUE 03-15-2029	6.96	7.09	8.29	Baa1	BBB+
AMERICAN WTR CAP CORP 2.8% DUE 05-01-2030	8.25	8.32	9.42	Baa1	A
AMERICAN WTR CAP CORP 3.45% DUE 05-01-2050	19.31	19.40	29.44	Baa1	A
AMERN TOWER CORP 1.0% 15/01/2032	10.31	10.41	11.13	Baa3	BBB-
ANHEUSER-BUSCH 2.875% 02/04/2032	9.69	9.82	11.35	Baa1	BBB+

Source: RADAR

If you require any further information on credit ratings and how they may affect your investment portfolio, or even how to access this data via RADAR or other IRAS platforms, please contact your IRAS Consultant who will be happy to assist.

References:

- Larry Harris, PhD, CFA, Structure of the Investment Industry ,CFA Institute.© 2014 CFA All rights reserved.Krista Santos, Debt Advisory Rothschild, London https://www.treasurers.org/ACTmedia/ITCCMFcorpcreditguide.pdf
- Salmon Felix, The difference between S&P and Moody's, Reuters, 9/08/2011.
- Moody's $864m penalty for ratings in run-up to 2008 financial crisis, The Guardian, 14/01/2017

SOCIALLY RESPONSIBLE INVESTING WITHIN IRAS POST-TRADE COMPLIANCE SERVICES

By Natasha Patel, Consultant - Investment Compliance and Swapna Balan, Consultant - Investment Compliance

Over time, investors have become more and more interested in the ESG footprint of their portfolios in line with the evolution of financial markets and regulatory developments. We note that the ESG principles align with many of our clients' internal core values and visions.

ESG has risen steadily up the investment news agenda for several years, mirroring wider societal concern over issues such as climate change and gender representation across business. For example, during the last year with the COVID-19 pandemic, the increased attention to the 'Black Lives Matter' movement and women in leadership display how ESG topics have become an even more important part of our day-to-day lives.

Index returns indicated that ESG funds were more resilient and outperformed the wider market during the COVID-19 crash in March 2020. Increasingly, market commentators are suggesting that there is a correlation between ESG investing and positive excess returns.

As mentioned, the recent pandemic has enhanced ESG investment appeal, and Northern Trust's Compliance Monitoring system, Compliance RADAR, is developed in conjunction with the needs of our clients and changing market landscape. This is not a new service for Northern Trust, but a continuous development of the service. Northern Trust's support for Socially Responsible Investing (SRI) and has expanded to include an extensive range of ESG factors.

Northern Trust offers its clients a broader coverage of ESG categories within the Investment Compliance monitoring services. The most commonly used categories that Northern Trust monitors are: adult entertainment, alcohol, gambling, pork production, tobacco, arms and ammunition.

> SRI is a type of investing that keeps in mind the environmental and social effects of investments, while ESG focuses on how environmental, social and corporate governance factors impact an investment's market performance.

Previously, we could only restrict investment in securities that fall under these sectors based on a 0% revenue threshold. For instance, if an investment manager is investing in a company which has more than 0% of its revenue deriving from controversial weapon activities, we would receive a breach notification regardless of the percentage of revenue that this company generates in relation to controversial weapon activities. This is a characteristic of ESG monitoring, known as negative screening.

We have enhanced our offerings so that our system can now service a broader range of observations as the involvement of ESG within investment management agreements has risen. For example, more of our clients are concerned about supporting tobacco, alcohol and SRI elements in their investment mandates. Northern Trust's Compliance platform can check the revenue derived from these sectors and has the flexibility to allow the client to select the breach exception limit for each ESG category.

The breach reports below show examples of typical SRI breaches that a client would see in Compliance RADAR. The asset information alongside the revenue generated from the particular category is shown.

Figure 1:

Compliance Breach Result - Fail - SRI — Valuation Date: **1-Dec-2020**

Rule Name	SI38133 - SRI Weapons - Maximum Percentage of Revenue > 8.5%	**Rule Run Date:** 2-Dec-2020
Rule Narrative	Securities issued by companies with ties to Weapons Production are prohibited if exceeds Maximum Percentage of Revenue > 8.5%.	

Breach Result — **Numerator:** 68,469,861.19 **Denominator:** 1,842,241,762.09

Account ID	Account Name	Total Market Value	Securities Triggered	% Results
	J P MORGAN ASSET MANAGEMENT	68,469,861.19	3	3.72

Asset Category/Name	Country of Risk	Security Identifier	Weapons - Maximum Percentage of Revenue	Security Weight %	Shares/Par Value	Market Value Base	Id Type
Equities							
Common Stock							
Common Stock							
BOOZ ALLEN HAMILTON HLDG CORP CL A COM STK	United States	US0995021062	9.99	0.67	137,390.00	12,297,778.90	ISIN
LEIDOS HLDGS INC COM	United States	US5253271028	10.50	2.11	383,160.00	38,944,382.40	ISIN
RAYTHEON TECHNOLOGIES CORP	United States	US75513E1010	44.99	0.94	240,258.00	17,227,699.89	ISIN

Source: Compliance RADAR. For illustrative purposes only. This is not a recommendation to buy, sell or hold securities in a particular investment.

Figure 2:

Compliance Breach Result - Fail - SRI — Valuation Date: **1-Dec-2020**

Rule Name	SI38132 - SRI Pork - Maximum Percentage of Revenue > 8.5%	**Rule Run Date:** 2-Dec-2020
Rule Narrative	Securities issued by companies with ties to Pork Production are prohibited if exceeds Maximum Percentage of Revenue > 8.5%.	

Breach Result — **Numerator:** 667,662.64 **Denominator:** 1,224,774,746.25

Account ID	Account Name	Total Market Value	Securities Triggered	red
	CREDIT SUISSE MSCI WORLD FACTO	667,662.64	3	

Asset Category/Name	Country of Risk	Security Identifier	Pork - Maximum Percentage of Revenue	Security Weight %	Shares/Par Value	Market Value Base	Id Type
Equities							
Common Stock							
Common Stock							
HELLOFRESH SE NPV	Germany	DE000A161408	9.99	0.02	4,866.00	285,841.84	ISIN
NH FOODS LTD NPV	Japan	JP3743000006	35.00	0.00	1,314.00	57,220.65	ISIN
TYSON FOODS INC CL A COM (DELAWARE)	United States	US9024941034	15.00	0.03	4,830.00	324,600.15	ISIN

Source: Compliance RADAR. For illustrative purposes only. This is not a recommendation to buy, sell or hold securities in a particular investment.

The extracts above show the maximum gross revenue generated by each company, for each of the SRI categories. On the basis of this information, clients may assess if there is a breach in their investment guideline and challenge their fund managers who will then take necessary measures.

We have also developed flexible solutions to restrict an aggregate of categories as opposed to a single category restriction. For example, many investment management agreements for Middle Eastern clients include Islamic Shariah-compliant laws. Shariah rules can be coded to incorporate an aggregate of the Shariah-governed categories of tobacco, alcohol and gambling restricted at a client specific value. Northern Trust's Compliance platform can ensure that a certain percentage of clients overall portfolio will adhere to these ESG parameters.

Clients have the option to monitor categories based on the primary business involvement or ownership. For example, a particular company can be owned by or have ownership of an alcohol, tobacco or pork company. There are many business involvement screens that Northern Trust offers, which range from animal welfare and fur, to nuclear power, stem cell research and civilian firearms.

Other clients look at SRI, but from a company perspective, so we have therefore extended our Compliance services by monitoring exclusion lists for specific companies. These are monitored in a similar way to the SRI rules whereby investment is restricted in a certain company, using public identifiers (such as ISINs or SEDOLs) that are shared by clients. Common examples of this are thermal coal mining, coal power, oil sands and arctic drilling.

In addition to our Compliance monitoring services, Northern Trust supports a wider range of ESG reporting which offers a quantitative approach to measuring environmental, social and governance. Clients can analyse their ESG credentials relative to a chosen benchmark at a total plan as well as manager level. Details are available for the largest contributors to allow for engagement with investment managers and help manage any potential reputational risk. If a client subscribes to the above mentioned ESG reporting on a periodic basis (e.g. monthly), compliance checks can be incorporated within the same service. For example, we can report when one of the E, S or G ratings fall below a specific ratio.

If you would like further information regarding our ESG or Post-Trade Compliance services, please contact Avish Singh (AS463@ntrs.com) or Nicolo Taverna (NT93@ntrs.com).

IRAS UPDATES: INVESTMENT RISK SERVICES

Investment Risk Services offers clients innovative solutions to complex risk challenges using sophisticated analytical tools which leverage our experience, global infrastructure and best-of-breed risk engines. We offer clients access to market leading third party risk engines including MSCI BarraOne and StatPro Risk Management.

Our services support multiple perspectives as no single measure provides a complete view of risk. Our risk tools offer multiple asset class coverage coupled with extensive Over-The-Counter (OTC) derivative modelling capabilities.

Investment Risk Services offers clients timely and accurate analysis using our single global data and technology platform. Our platform is fully integrated across performance, risk and compliance services with direct accounting feeds which enable seamless data integration. Investment Risk Services enables clients to leverage a cost-efficient risk solution offering a complete and consistent view of risk across both assets and liabilities from an independent source.

We offer clients a complete risk solution including:

- Ex-ante risk analysis - benefit from holdings based, forward looking risk analysis underpinned by market leading, multi factor risk models.
- Risk decomposition - gain a broad understanding of your risk profile using risk decomposition and trend analysis alongside correlation and diversification benefit analysis.
- VaR suite - gain valuable insight into your portfolio using total risk metrics and multiple Value at Risk methodologies including parametric, Monte Carlo and historical simulation.
- Extensive stress testing - access extensive factor stress testing and custom scenario analysis capabilities to understand the impact of different market conditions on assets and liabilities.
- Liability modelling - incorporate liability cash flows and utilise a consistent risk methodology to model both assets and liabilities.
- Style exposures - leverage benchmark relative style analysis to highlight key exposures, confirm intended positioning and expose unintended risks.

For further information on how our Investment Risk Services could benefit your portfolio analysis and forecasting, please contact:

Nicolo Taverna
Investment Risk & Compliance Manager, EMEA
nicolo.taverna@ntrs.com
+44 (0) 207 982 1365

IRAS UPDATES: PRIVATE MONITOR

Portfolios containing private equity and other alternative assets require a private equity expert who understands these investments from various perspectives; asset management, administration and servicing. With Northern Trust, you can rely on our experience, excellence and leadership in the global private equity marketplace to support even the most diverse and complex investment programs.

At Northern Trust, we unite our expertise with industry-leading products and tools, including Private Monitor®, which help enable better decisions and better results for our clients. Whatever your requirements, Northern Trust is dedicated to working with you to create solutions to meet your specific immediate and long-term private equity needs.

Sophisticated Products
Sophisticated institutional investors will find a broad array of private equity products at Northern Trust. You can leverage our system or choose individual tools based on your resources and requirements, benefiting from our ability to combine proprietary expertise with innovative tools to create the most useful solutions.

Private Monitor Service
Enable better decision-making with our cutting-edge products and services with Private Monitor to pursue better results. Private Monitor brings a variety of features to assist with administrative tasks, activity tracking, liquidity analysis and performance and risk management services.

The Private Monitor service allows you to focus on investing while an experienced Northern Trust team manages your data, performance and other needs related to administering a private equity portfolio using state-of-the-industry tools, techniques and data. Private Monitor can help you manage your program by providing performance, funding tracking, benchmarking, holdings transparency analysis, risk and liquidity monitoring, and front office tools and capabilities.

Private Monitor can help unlock a portfolio of private markets data – if this is of interest, we would be delighted to help. For more information please contact:

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PLEASE CONTACT US:

For more information on any of the topics covered in this edition, or to provide feedback or make suggestions for future editions, please contact your IRAS representative or Liam Nesbitt using the details below.

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