Optimal investment strategies of conservative investor – reinsurer

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Abstract: The aim of this paper is to evaluate investment strategies of conservative investor – reinsurer and assess their performance. In addition, risk exposure is assessed as well. The ultimate goal is to recommend optimal investment strategy for a given investor's risk profile which is influenced by reinsurer's underwriting risk sourced from its core business activities, i.e. sale of reinsurance products to various business segments with various risk exposures. Considering risk pool of particular liability (i.e. from its multiple business segments) and underlying investment portfolio, reinsurer's portfolio managers seeks to choose suitable investment strategy that matches risk profile of given portfolio. For the purpose of study of this specific investor's risk profile, reinsurer's investment process is further analysed with focus on Asset Liability Matching (ALM) framework. Core business activities of reinsurer source significant stream of liquidity which makes reinsurer alongside pension funds and insurance companies significant subject on financial market in terms of investing, however its investment strategies are limited predominantly to conservative strategies due to government regulations, i.e. Solvency which portfolio manager has to consider. We modelled and analysed reinsurer's three investment strategies: (i) North American Equity USD Strategy, (ii) Structured Credit North American USD Strategy and (iii) Corporate Credit North American USD Strategy. Bloomberg Terminal and BlackRock Aladdin platform were used to source securities, construct portfolios and assess their performance on a 5 year period. The length of the assessed period was chosen due to period of macroeconomic stability without disturbing events, e.g. shocks and contractual life of underlying underwriting products.

Keywords: reinsurer, investment strategies, portfolio management
JEL Classification: G22, G11, C32

1 Introduction

Business subjects from various industries, but predominantly retail insurers seek ways to reduce risks. The issue of risk management has become critical for the tenure of managers. Particular type of such risk insurees aim to minimise is characterised by high-variance risks of their insurance portfolios. Insurers and businesses intend to transfer risks fully or at least partially on a second party by buying reinsurance protection from reinsurance companies in order to cover losses they do intend to fully retain. Reinsurance can be defined as process where reinsurer (entity A) issues insurance contract to compensate the reinsure (entity B). For retail insurers, reinsurance reduces underwriting and solvency risks and enables insurers to sell additional insurance products, i.e. underwriting. Such transfer of risk imposes additional cost on risk transferor, i.e. reinsuree in form of reinsurance premium payable to reinsurer. In perfect market, reinsurance premium for catastrophic events should be similar to expected losses as catastrophic events are uncorrelated with financial markets (Froot, 2000 and Gall, Nguyen, Cutter, 2015). In general terms however, the higher magnitude of the expected risk transfer to a reinsurer, the more expensive the reinsurance premium is (MacGregor, Nanthakumaran and Orr, 2012; Wu and Olson, 2017; Porth, Pai and Boid, 2014). There are many reasons why businesses seek reinsurance protection (Venter, 2006; Mankaï and Belgacem, 2016). Risk transfer from retail insurer to reinsurer is expensive. There are multiple methodologies for estimating its cost (Froot, 2001; Gall, Nguyen, Cutter, 2015; Porth, Tan, and Weng, 2013; Porth, Pai and Boid, 2014; Porth, 2011). It is important to emphasize that the cost of reinsurance cover has been increasing due to increase of catastrophe events in the world in recent years (AON, 2023; Munich Re, 2021; Swiss Re, 2022). As reinsurer's objective is to determine the shareholder value created by the company, reinsurer uses valuation framework referred to as Harmonised Valuation Methodology (HVM) and asset liability matching (ALM). The most recognised model or ALM and value creation in reinsurance is provided by Bingham (2000) and Bingham (2004), which led to development of individual HVMs of global mayor reinsurers and the most lately to formulation and implementation of IFRS 17 (IFRS, 2023) for reinsurers. Reinsurer generates profit from underwriting business by achieving total return which exceeds the cost of raising the funds from underwriting and future claims being lower than expected or nil. These premiums are

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subsequently handed over asset management which buys and manages investment portfolios, thus are converted into assets. Such investment portfolios are matched by underlying liabilities by asset liability matching framework. This approach enables to split economic balance sheet into investment and underwriting balance sheet, thus separate underwriting risk from market risk and enable to earn profit on the top of underwriting activities, from investment activities, thus create additional added value. Considering risk pool of particular liability, reinsurer chooses appropriate investment strategy. The result of the chosen investment strategy is the portfolio performance itself, which is measured against the respective benchmark (Prather, Bertin, and Henker, 2013). Reinsurer, however does not necessarily aim to beat the respective benchmark as many benchmarks used in reinsurance are used in relation to ALM. Such benchmarks are easy to beat as portfolios with significant weightings in in equities tends to exceed the growth rate of liabilities (Blake and Timmermann, 2013, 2011; Korkie, 2002; Tonks, 2002). The challenge for investors, is not limited to the choice of asset class, but to how to construct a portfolio that best suits their risk profile (Massa and Patgiri, 2009).

1.2 Research Aim and Hypotheses

The aim of this paper is to assess three investment strategies of conservative investor, i.e. reinsurance corporation, in particular: (i) North American USD Equity Strategy, (ii) Structured Credit North American USD Strategy and (iii) Corporate Credit North American USD Strategy and to recommend optimal USD investment strategy for a given investor's risk profile which is influenced by reinsurer's underwriting liability profile, considering also portfolio size. Secondly, we are interested in investment performance of each strategy, in particular if each strategy beats the selected benchmark (MSCI or tailored) and risk, volatility and duration of each strategy. Furthermore, we suppose that North American Equity Strategy will provide the highest return and outperform all strategies in accordance with the Modern Portfolio Theory. This paper also aims to provide general recommendation for optimal investment strategies for conservative type of investors, especially those which are subject to strict regulation, e.g. Solvency, Solvency II, Basel I – III, liability-driven investment regulations, etc.

2 Methods

Reinsurer makes profit on their core business activities, i.e. underwriting by earning a total return that exceeds the cost of raising funds from underwriting activities and future claims that are lower than expected or zero. These premiums are then passed to asset management where underlying liabilities are matched to assets within ALM process by investing them on global financial markets. Based on core business profile of modelled reinsurer, i.e. underwriting activities, 70% of its income is sourced in USD due to the domicile of its customers, e.g. retail insurers, global corporations in USA or contractual currency of its international customers. When making investment decision, reinsurer constructs asset portfolios comprising of a variety of asset classes, depending on risk profile of underlying liabilities and considers trade-off between its expected return and conservative risk profile influenced by risk profile of underlying underwriting contracts. The choice of asset class should match the risk profile of the underlying liability from underwriting. Conservative investor what reinsurer is, tries to minimize all types of risks within ALM. Due to the significant currency exposure of its underwriting part is sourced in USD, i.e. 70%, reinsurer's asset management invests into securities denominated in USD. This eliminated potential foreign exchange risk which is incurred by investing into non-USD denominated assets.

Due to the risk pooling, i.e. consolidation of income from underwriting activities based on their business and risk profile on a global level under specific groups, reinsurer allocates 15 bil. USD to be invested to particular portfolios (Table 1). Reinsurer's asset management applies three investment strategies constructed based on underlying asset classes of particular portfolios. Reinsurer applies (i) North American USD Equity Strategy, (ii) Structured Credit USD Strategy and (iii) Corporate Credit USD Strategy. For each investment strategy a unique investment portfolio is constructed based on specific criteria:

(i) North American Equity USD Portfolio,

The objective is to outperform broad equity market, as well as selected MSCI benchmark while retaining a defined level of portfolio diversification and liquidity. Focus should be on fundamental value with the primary driver of returns related to security selection. The portfolio is to be managed with the goal to achieve a total return in excess of the benchmark. Currency mismatch is not permitted, portfolio must be constructed of USD denominated securities. The use of leverage, borrowing, securities lending, and short selling is not allowed. The assets are to be managed on a long-term basis due to 20 year duration of underlying underwriting liability. Permitted are equity and ETF instruments and investment in diversified portfolio of high quality bonds issued for environmentally friendly purposes in accordance with ESG framework and providing attractive returns.

(ii) Structured Credit North American USD Portfolio,

The objective is to actively manage portfolio to earn a reasonably high and stable level of income and achieve a total return in excess of the selected benchmark. Permitted portfolio securities are securitised bonds rated A- or higher (S&P and Fitch) or A3 or higher (Moody's). Furthermore, portfolio can be constructed by selecting agency residential mortgage backed securities (RMBS) and Commercial Mortgage Backed Security (CMBS) with a focus on fixed rate, asset backed securities (ABS), Collaterized Bond Obligation (CBO), Collaterized Loan Obligation (CLO), Auto ABS, Subprime Auto ABS, Credit Cards ABS, Bank ABS, US Student Loans (securitized FFELP) and cash securities. All investments must be denominated in USD. Use of leverage, borrowing, securities lending, and short selling is not allowed. All investment income and capital gains, if achieved, will be added to the assets of the portfolio and reinvested.

(iii) Corporate Credit North American USD Portfolio

The portfolio is to be actively managed to achieve a total return in excess of the selected benchmark. Permitted are fixed income and debt instruments issued or guaranteed by sovereigns or corporations, US plain-vanilla treasuries and agency direct debt (including short-term instruments and cash on deposit. Permitted investments must be rated at least BBB- or higher (S&P and Fitch) or Baa3 or higher (Moody's). Taxable municipal bonds, rated A- or higher (S&P and Fitch) or A3 or higher (Moody's). U.S. plain-vanilla treasuries and U.S. agency direct debt obligations (including short-term instruments and approved money market funds). All investments must be denominated in USD.

Aladdin BlackRock portfolio management software and Bloomberg Terminal are used to construct portfolios, source data, evaluate investment portfolio performance and assess portfolio risk profile. In particular, Bloomberg PORT function was used which allows to assess and measure the portfolio risk exposure, to perform risk metrics to evaluate the portfolio risk profile, e.g. standard deviation, beta and to measure inception to date (ItD) absolute return. PORT enables users to evaluate and modify the allocation of assets within their portfolios. It provides tools to assess the distribution of investments across asset classes, sectors, geographical regions and other parameters, helping to improve portfolio diversification and risk management. In addition, PORT can perform scenario analysis by simulating different market conditions and measuring their impact on portfolio performance. It facilitates a deeper understanding of the potential outcomes and risks associated with different market scenarios through access to real-time market data, news updates, research reports and fundamental data, thereby enriching portfolio analysis and the decision-making process.

Table 1. Investment Strategies Fund Allocation Size

Investment Strategy/Portfolio	Allocated capital from underlying liability pool (millions USD)	Percentage of total from underlying liability pool
North American Equity USD	3,750.00	25.00%
Structured Credit North American USD	9,000.00	60.00%
Corporate Credit North American USD	2,250.00	15.00%
T O T A L	*15,000.00*	*100.00%*

Source: Own processing

Investment strategies and portfolios are assessed between 2010-2015 timeframe. The reason for the choice of given timeframe is due to confidentiality and the data availability only for closed and inactive underwriting contracts at the time of writing this paper. In addition, 2010-2015 has been characterised by recovery after 2008 financial crisis with significant returns among almost every asset class, no significant macroeconomic shocks (European Debt Crisis terminated in 2010 which is the default year for portfolio assessment). Stimulus by world's major central banks boosted performance of multiple asset classes.

3 Research results

We constructed and analysed reinsurer's three investment strategies, i.e. portfolios during 2010 -2015: (i) North American USD Equity Portfolio, (ii) Structured Credit USD Portfolio and (iii) Corporate Credit USD Portfolio.

3.1 North American USD Equity Portfolio

To this investment strategy was allocated 25% of total NAV raised from underwriting activities which based on Table 2 and Figure 1 provided 102.6% inception to date return (ItD) which bet the respective benchmark (S&P 500 TR) and doubled the originally allocated NAV which significantly created value for reinsurer from its investment activities.

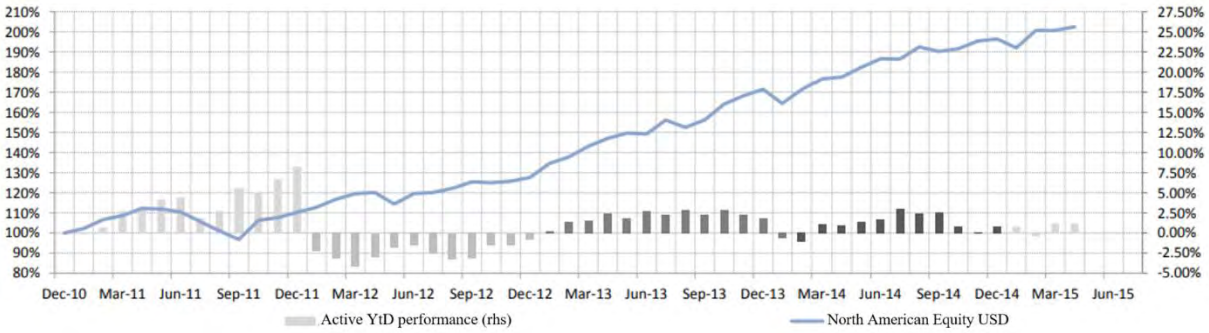
Table 2. North American USD Equity Portfolio Performance Overview

Portfolio	NAV (mil USD)	% allocated NAV on total NAV	ItD Return (%)	Benchmark	Beta	Sharpe Ratio
North American Equity USD	3,750.00	25.00%	102.6%	S&P 500 TR[2]	2.102	0.42

Source: Own processing, based on Aladdin BlackRock (2023) and Bloomberg Terminal data (2023).

North American USD Equity Strategy invests into large cap companies with geographic focus on the USA only. Strong performance was driven by its strategic asset allocation into growth industries: 17.7% of NAV was invested into healthcare, 15.6% of NAV into energy, 14.8% into IT, 12.2% into financial services, 11.9% into consumer goods industry, 6.2% into telecommunications, 8.4% into industry and 13.2% into cash, utilities and other. In terms of assessing risk-adjusted performance by Sharpe Ratio of 0.42 we follow the logic, the greater a portfolio's Sharpe ratio is, the better its risk-adjusted performance is. Portfolio's volatility in measured period by Beta was 2.102 which indicates that Portfolio's price activity is more volatile than the market with magnitude of volatility twice as strong as the market expressed by selected benchmark. Beta of measured investment security is a quantitative risk statistic metrics that measures historical volatility relative to the market as measured by a relevant index. Portfolio with values of Beta > 1indicates the portfolio is more volatile than the market in a given time frame. On the contrary, portfolio with values of Beta < 1 is less volatile than the market. Beta = 1 indicate movement similar to the index, i.e. the market.

Figure 1 North American USD Equity Portfolio Performance (Value Added Monthly Index) 2010-2015



Source: Own processing, based on Bloomberg Terminal Data (2023).

3.2 Structured Credit North American USD Portfolio

Structured credit portfolio is the total amount of funds allocated by reinsurer into structured credit products which are created via securitisation process which involves pooling similar debt obligations into interest-bearing securities by those assets and issued and sold to investors. This pooling relocates risk and return potential in the underlying loan (Oaktree Capital, 2023). 60% of total NAV raised from underwriting activities was invested into Structured Credit USD Strategy and provided ItD return of 12.9% which bet the selected MSCI Composite Benchmark.

[2] Total Return

Table 3. Structured Credit North American USD Portfolio Performance Overview

Portfolio	NAV (mil USD)	% allocated NAV on total NAV	ItD Return (%)	Benchmark	Beta	Volatility	Sharpe Ratio
Structured Credit North America USD	9,000.00	60.00%	12.9 %	MSCI Composite Benchmark	0.99	2.03%	0.62

Source: Own processing, based on Aladdin BlackRock (2023) and Bloomberg Terminal data (2023).

Risk-adjusted performance measured by Sharpe Ratio is 0.62. Portfolio's volatility in measured period was 2.03% or if measured by Beta 0.99 which indicates that Portfolio's price movement is similar to the market and is strongly correlated with the market.

3.3 Corporate Credit North American USD Portfolio

Reinsurer's investments into Corporate Credit USD Portfolio represent the lowest allocation of its NAV for investment of just 15%, which based on Table 4 provided ItD return of 20% and bet the MSCI Composite Benchmark. This is the second best performing portfolio after North American USD Equity Portfolio.

Table 4. Corporate Credit North American USD Portfolio Performance Overview

Portfolio	NAV (mil USD)	% allocated NAV on total NAV	ItD Return (%)	Benchmark	Beta	Volatility	Sharpe Ratio
Corporate Credit North American USD	2,250.00	15.00%	20.0 %	MSCI Composite Benchmark	0.90	2.85%	0.51

Source: Own processing, based on Aladdin BlackRock (2023) and Bloomberg Terminal data (2023).

In terms of volatility, Corporate Credit USD Portfolio's volatility in measured period was 2.85% or if measured by Beta 0.90, i.e. it is less volatile than the market measured by MSCI Composite Benchmark In comparison to Structured Credit USD portfolio, it is less volatile. In terms of assessing risk-adjusted performance by Sharpe Ratio of 0.51, this portfolio has worse risk-adjusted performance than Structured Credit USD Portfolio.

Conclusions and discussion

The aim of this paper is to evaluate three investment strategies of conservative type of investor, a reinsurance corporation whose investments are limited by its specific business profile due to asset-liability matching process and liability-driven investments and at the same time, being subject to strong regulations, i.e. Solvency I and Solvency II. It was assessed whether analysed investment strategies bet the market as expressed by selected benchmarks. In addition we recommend the optimal investment strategy with suggested optimal allocation of NAV of total NAV by considering high opportunity costs of allocating them into other strategy with given investor's risk profile.

70% of reinsurer's income from underwriting activities is sourced in USD due to the domicile of its main customers in the US or majority of its international customers with USD as contractual currency. Due to this fact, all three portfolios are constructed of USD denominated securities in order to eliminate possible foreign exchange risk which for conservative type of investor - reinsurer, would be an additional source of risk. Due to the pooling of underlying underwriting liabilities, three investment strategies, i.e. portfolios were constructed and assessed: (i) North American Equity USD Strategy, (ii) Structured Credit North American USD Strategy and (iii) Corporate Credit North American USD Strategy.

Having considered partial results for each investment strategies as seen in Tables 1-4, it can be concluded that the best performing strategy in form of ItD return is North American Equity USD Strategy (102.6% ItD) with the highest volatility expressed by beta of 2.102, i.e. is moving twice as much as the broader market. Due to the reinsurer's profile as conservative investor, only 25% of NAV of income sourced from underwriting activities is allocated to it. Due to underlying underwriting risk profile, it is undesired for this type of investor to have opened highly volatile positions with significant exposure both, either upside or downside. Especially, the case of adverse exposure and need to provide sufficient cash to fulfil contracted underwriting obligations, i.e. compensation of reinsures could result into inability to liquidate negatively exposed positions not only with profit or zero profit, but with loss, which results into loss and depending on the size of exposure a possibility of bankruptcy of reinsurer.

The second best-performing strategy is Corporate Credit North American USD Strategy (20.0% ItD), however with the lowest NAV of all strategies allocated to it of just 15%. Although the highest amount of NAV invested of all strategies (60%) was invested into Structured Credit North America USD Strategy, this portfolio provided the lowest return of just 20.0% ItD.

In terms of volatility measured by beta, a quantitative risk statistic metrics that measures historical volatility of portfolio relative to the market, the most volatile strategy is North American USD Equity Portfolio (2.102) being twice as volatile as the market, followed by Structured Credit North America USD Portfolio (0.99) being similarly volatile as the market and least volatile Corporate Credit North American USD (0.9) being less volatile than the market measured by the selected benchmark. In terms of assessing risk-adjusted performance by Sharpe Ratio, the greater a portfolio's Sharpe ratio is, the better its risk-adjusted performance is. Structured Credit North America USD Portfolio (0.62) provides better risk-adjusted performance than Corporate Credit North American USD Portfolio (0.51). The lowest risk-adjusted performance is offered by North American Equity USD Portfolio (0.42)

Following the redistribution of funds (in NAV) sourced from underwriting activities as seen in Table 1, it can be concluded that reinsurer applies strictly conservative policy of preferring strategy with the best risk-adjusted performance and not considering solely ItD return. The opportunity costs of this investment allocating decision is high. By considering underlying underwriting liabilities' risk profile and reinsurer's profile, we recommend to reduce allocation into Structured Credit North America USD Portfolio from 60% to 30%, increase allocation to Corporate Credit North American USD from, 15% to 35% and increase allocation to Equities from 25% to 35%. As structured and corporate credit have similar risk parameters (Sharper Ratios of 0.62 and 0.51 and betas of 0.99 and 0.90 respectively), but different returns, shift to Corporate Credit materializes high opportunity cost of this strategy (ItD) by keeping similar level of risk. 10% increase of allocation to Equity Strategy does not increase risk significantly and partially enables utilisation of the highest opportunity costs which this strategy offers.

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