

AIMCo Board of Directors

VOLTS Investment Strategy Review

Summary of Results

June 30, 2020

INTRODUCTION

This report provides a review of the AIMCo Board's response to the recent VOLTS losses and the measures it has taken to guide the organization going forward.

On March 14, 2020 the Board was advised of significant losses incurred by AIMCo on one public equities strategy called VOLTS. VOLTS, or Volatility Trading Strategy, was one of 52 value-added or alpha strategies undertaken by the Public Equities group at AIMCo, and was entirely internally managed.

The Impact of COVID-19 on global equity markets was a magnitude and abruptness of volatility not seen since *Black Monday* in October 1987. While some losses on volatility strategies were to be expected, AIMCo experienced a significantly larger than expected loss, which is now fixed at \$2.1 billion or about one sixth of the investment returns generated by AIMCo in 2019.

In response the Board took actions to:

1. mitigate further VOLTS losses and, on management's recommendation, approve a plan to wind down VOLTS and permanently close the strategy, fixing losses at \$2.1 billion.
2. undertake a review of other value-added strategies to identify any with potential for outsized losses. This review confirmed that there were no other strategies with potential for outsized losses akin to VOLTS.
3. launch a comprehensive review of all aspects of VOLTS to determine changes to management processes and governance necessary to prevent any reoccurrence of a similar outcome. This report documents the review undertaken by the Board and summarizes the changes adopted as a result of this review.

In conducting this review the Board utilized several key internal resources including AIMCo's Internal Audit Group and its Chief Legal Officer, as well as external advice from Barbara Zvan, retired Chief Risk Officer of the Ontario Teachers' Pension Plan, and KPMG. Separately, AIMCo's CEO provided the Board with changes he believes are called for. As a result, the Board of AIMCo believes that it has a clear understanding of the events and circumstances which occurred leading up to this loss and the changes required to prevent its reoccurrence.

BACKGROUND ON VOLTS

AIMCo began investing in volatility contracts as a strategy in 2013. It involved at different points in time several distinct sub-strategies that involved trading over the counter derivative contracts based on the degree of daily volatility in various global public equities markets, and a downside risk component to mitigate deep tail risk. A detailed research paper prepared at the time analyzed three primary strategies: a one-month variance swap to capture the so-called implied versus actual volatility risk premium; a volatility term structure risk premium strategy;

and a downside risk component to mitigate deep tail risk. A combination of the three was recommended, with positions to be spread across multiple global equity markets to diversify geographic risk.

For an extended period the magnitude of investment was small and the contracts were predominantly one month simple variance swaps. Such swaps have a non-linear loss function under which losses are magnified by extreme volatility events such as the March 2020 COVID-induced market dislocation. However, the risk exposure in relation to the size of AIMCo's public equities portfolio was small and in keeping with similar strategies employed by many other asset managers.

Beginning in January of 2018 the scope of the volatility investment strategy was expanded to include capped/uncapped variance swaps. These swaps trade a relatively fixed return during typical to moderately high volatility conditions for a significantly more steeply tilted and non-linear loss function during high to very high volatility conditions and carry the risk of greatly magnified losses from extreme volatility events, such as the COVID-related volatility experienced in March or that experienced in the October 1987 *Black Monday* event.

At the same time that the VOLTS portfolio was being shifted towards the higher risk capped/uncapped contracts the size of the portfolio was being substantially increased above that of the pre-2018 strategy.

A legacy risk system was being used to measure and monitor the risks of public market instruments. It assessed investment risk using a value at risk (VaR) measurement at a (95%) confidence level on an annual basis. This is a common method of sizing active risk, which works reasonably well when the returns of portfolio investments are linearly related to underlying economic and market factors. However, it does not do a good job of assessing risk in a strategy like VOLTS with nonlinear returns, especially when nonlinearity appears largely outside the confidence interval. The VaR system would thus have reported minimal risks for the capped-uncapped strategy. To fully understand the risk of an investment like VOLTS and the potential for unacceptable losses, something more than active VaR is required. The limitations of the risk system had previously been recognized, and its replacement had been identified and was in the process of being implemented.

By January, 2020, Risk Management had modelled the risk involved in the capped-uncapped strategy being utilized and called for increased attention to the very low probability but nonetheless extreme tail risk of VOLTS. By the time Public Equities began to take action to reduce VOLTS exposure in early March, it was too late. Unprecedented and sustained volatility caused by the COVID-19 crisis made it impossible to unwind the positions without considerable loss.

SCOPE OF THE REVIEW

The purpose of the Board's Review was to examine all aspects of VOLTS from inception to early 2020 and to understand how the March 2020 positions with their risk characteristics came to be. The primary focus was to determine what changes were required to prevent a reoccurrence of an outcome like VOLTS.

The Board carried out a fulsome review which included examining:

- the original documentation and analysis of the VOLTS strategy
- the range of policies and procedures used to approve, monitor and report on investments such as VOLTS
- the trading authority limits structure and compliance with these limits
- the changes to the VOLTS strategy as it evolved over time
- the role of Risk Management in the identification, measurement, monitoring and management of investment risk
- the capacity of our risk system to properly measure risk in VOLTS type investments
- the operation of and communication between the first (Investments) and second (Risk Management) lines of defence in the organization
- the risk culture of the organization
- the escalation process to Senior Management of risk exposures which could lead to disproportionate losses
- the adequacy of reporting to the Board and clients of risks being taken in accordance with risk appetite and tolerance frameworks
- the role staffing resource constraints may have played
- the role the design of our compensation framework might have played in the incentive structure for management

RESULTS OF THE REVIEW

The main conclusions from the Board's review are:

1. The degree of challenge from the first and second lines of defense (Investment and Risk Management, respectively) regarding the VOLTS strategy was unsatisfactory.
2. The root cause of this was that the breadth and depth of risk governance controls, collaboration and risk culture, while evolving and improving over the past 2-3 years, are still unsatisfactory.
3. Escalation of analytics to senior management and the Board relating to the extreme tail risk inherent in the VOLTS strategy was incomplete and did not come soon enough.

The following section lists the changes which the Board has adopted and directed management to implement in these areas.

Changes Adopted

As a result of this work, the Board has adopted and instructed management to implement the following ten recommendations:

1. The CEO, CIO and CRO will take a personal leadership role in ensuring that the integration between Risk Management and investment management staff continues to mature towards a more collaborative, inclusive relationship.
2. To reinforce the intended organization-wide appropriately balanced risk culture the Corporation will expand its Risk Framework to include a broader and deeper description of Risk Appetite and Risk Tolerance. In addition, an enhanced process of dialogue and debate across the Corporation on these topics will be launched.
3. Management will propose for consideration and approval by the Board revised investment approval thresholds applicable to any investment strategy or product involving OTC options, swaps or other derivatives, other than derivatives used solely for purposes of hedging risks otherwise inherent in an investment strategy. Such approval thresholds will require approval at the Management Investment Committee level and at the Board Investment Committee for significant levels of investment and risk exposure.
4. The granularity of regular risk reporting to the Board will be expanded by inclusion of exposures/risk measures against any applicable thresholds and limits established for all products and strategies, including periodic updated stress testing results where these have been identified as important supplementary measures of tail risk.
5. Management shall develop an escalation and remediation procedure which will identify risks that could lead to disproportionate or otherwise unexpected losses regardless of the risk limit.
6. At the origination of any new strategy or product, or an expansion of a strategy or product, or a change in the design and description, the Risk Management group will provide the approving authority with an independent review of all significant investment risks associated with the investment. The risk review will:
 - a) include stress tests to ensure that risk characteristics are fully understood for unlikely but possible scenarios;
 - b) advise if the derivatives to be employed involve a level of complexity which presents difficulties in accurately modelling and measuring the risks of a strategy or product;
 - c) advise whether the Corporation's standard risk budgeting measure will be sufficient to ensure that the investment does not exceed the Corporation's risk tolerance and,

- if not, what supplementary measures should be applied to limit the magnitude of the investment to comply with the Corporation's risk tolerance;
- d) advise whether the expected trading liquidity of the derivatives to be employed is likely to limit the Corporation's ability to unwind the positions reasonably promptly if so required;
 - e) review the adequacy of staff requirements in terms of experience and skills to undertake the proposed strategy; and
 - f) the enhancements above will be applied to reapproval of all existing strategies and products to which they would have been applicable if in effect at the time of the original approval, on a priority schedule established by the CEO in consultation with the CRO and CIO.
7. At the origination of any new strategy or product, or the expansion of a strategy or product beyond the initially approved amount, or a change in the design and approved description, the strategy or product description will clearly identify any risk that an amount in excess of the investment could be lost.
8. Any change in the design or description of a product or strategy, other than a purely administrative change, will require the modified strategy to be re-approved by the original approving authority including all the applicable risk assessment policy requirements, as if it is a new product or strategy.
9. The Board's Human Resources and Compensation Committee will continue its compensation framework redesign initiative working closely with management and the independent advisors and including features to reinforce risk and investment management integration and a consistent organization-wide balanced risk culture. These will include a provision for a meaningful portion of the compensation of both investment management and risk management staff to depend on their degree of improved collaboration.
10. In addition to the personnel changes already announced, the Board has asked the CEO to update and to revise as appropriate the Corporation's talent management strategy, organizational design and management succession plan.

CONCLUSION

The changes adopted by the Board to prevent a reoccurrence of a VOLTS-like severe loss do not prohibit volatility investments or other derivative-based investment strategies, but rather establish a much more stringent set of analysis, review and approval processes which such a strategy or product would need to satisfy, including approval by the Board above a certain level of exposure. VOLTS in the form implemented after January 2018 would not be approved with these more stringent processes in place.

No matter how carefully designed a set of prescriptive rules are, a so-minded individual or group can usually find a way to circumvent such rules. Consequentially, the most important changes emerging from the Board's review are actually not process changes at all, but rather changes to the culture in which the rules are to be embedded. With the oversight of the Board, senior management will continue to move AIMCo's culture toward a more collaborative environment among risk and investment professionals. These changes are not so easily effected and will require strong focus and leadership from the Board and senior management, as well as continuous evaluation against clear, predetermined benchmarks.

Oversight of AIMCo's investment strategies and risk management is the responsibility of the Board of Directors. The losses incurred by our clients as a result of the VOLTS strategy are wholly unacceptable. The Board is determined that the lessons from this experience will improve AIMCo's management processes, prevent any similar occurrences and, most importantly, strengthen the risk culture of AIMCo.