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December 22, 2016

VIA E-MAIL

British Columbia Securities Commission
Alberta Securities Commission
Financial and Consumer Affairs Authority of Saskatchewan
The Manitoba Securities Commission
Ontario Securities Commission
Autorité des marchés financiers
Financial and Consumer Services Commissioner (New Brunswick)
Superintendent of Securities, Department of Justice and Public Safety, Prince Edward Island
Nova Scotia Securities Commission
Securities Commission of Newfoundland and Labrador
Registrar of Securities, Northwest Territories
Registrar of Securities, Yukon Territory
Superintendent of Securities, Nunavut

Attention:
The Secretary
Ontario Securities Commission
20 Queen Street West
22nd Floor
Toronto, Ontario M5H 3S8
comments@osc.gov.on.ca

Me Anne-Marie Beaudoin
Corporate Secretary
Autorité des marchés financiers
800, square Victoria, 22e étage
C.P. 246, tour de la Bourse
Montréal (Québec) H4Z 1G3
consultation-en-cours@lautorite.qc.ca

Dear Sirs/Mesdames:

Re: CSA Notice (the "Notice") and Request for Comment *Modernization of Investment Fund Product Regulations – Alternative Funds* (the "Alternative Funds Proposal")

We are writing in respect of the request for comments dated September 22, 2016 regarding the Alternative Funds Proposal. We appreciate the opportunity to comment on these important matters.

Invesco Canada Ltd. is a wholly-owned subsidiary of Invesco, Ltd. Invesco is a leading independent global investment management company, dedicated to helping people worldwide build their financial security. As of November 30, 2016, Invesco and its operating subsidiaries had assets under management of approximately US$805 billion. Invesco operates in 20 countries in North America, Europe and Asia.

Invesco Canada is registered as an Investment Fund Manager, an Adviser and a Dealer in Ontario and certain other provinces. Our investment products are primarily bought by and sold to retail investors and institutional investors. As such, we take a great interest in regulatory discussions that impact those investors.

Over the last several years, the Canadian Securities Administrators (the "CSA") has undertaken a review of National Instrument 81-102 *Investment Funds* ("NI 81-102") under the guise of "modernization". We applaud these efforts and have largely been supportive of these efforts and the Alternative Funds Proposal is no different. Overall, we believe that the Alternative Funds Proposal is a good, although imperfect, proposal that is good for Canadians. We will not address the importance of alternative investment fund products in a properly diversified client portfolio as it is clear that the CSA understands this. We welcome the CSA's evolution in thinking in this area and note that the Alternative Funds Proposal will allow Canadian fund manufacturers and their clients to catch up to the rest of the world with respect to alternative investment fund products.

We note that similar initiatives (at least insofar as derivatives and leverage are concerned) have been carried out in Europe and are underway in the U.S. although, in each case, the scope of products for which the initiatives are attached may differ slightly. The common thread through these proposals is the total leverage limit. Overall, we believe the major issue to be addressed with the Alternative Funds Proposal is the total leverage limit and, so, we will begin our comments with that – in the framework of the questions posed in the Notice – and then answer selected other questions from Appendix A.

Total Leverage Limit

Question 9

In response to the CSA's question 9 in Appendix A, in our opinion the proposed leverage limits would make it very difficult and in some cases impossible to offer in Canada, under NI 81-102, global macro strategies, managed futures strategies and many risk parity and unconstrained bond strategies, all of which depend on derivatives. We note that Canadian retail investors generally have less access to risk-managing products than investors in other countries due to the derivatives rules in NI 81-102.

Question 10

In response to the CSA's question 10, our greatest concern with the Alternative Funds Proposal is what we perceive to be the mistreatment of leverage. In this sense, the Alternative Funds Proposal is almost identical to the initial draft of Proposed Rule 18f-4 (the "US Proposal") published by the Securities and Exchange Commission in the United States (the "SEC"). The fund management industry was heavily critical of the requirement to use gross notional amount for derivatives in the leverage calculation. In a comment letter filed with the SEC by our affiliate Invesco Advisers, Inc. (the "US Comment Letter"), Invesco stated:

> "A leverage limit based on gross notional exposure is inherently flawed because greater economic leverage does not necessarily mean greater risk. Simply summing the notional amount of a fund's derivative investments provides a distorted picture of risk because it disregards the effects of any hedging or risk-mitigating derivatives transactions. Consequently, the [US Proposal's] general limits on a fund's gross notional exposure across all derivative instruments will not serve to limit risk and volatility uniformly across all funds that invest in derivative instruments. As the [SEC] explained in the [US Proposal], the risk and volatility profile of two different derivative instruments, both with the same notional amount, may be vastly different....So although a leverage limited based on notional amounts has an ostensible benefit in terms of simplicity, it has an associated cost: it treats all of a fund's derivatives transactions as though they were the one-way speculative directional bets made by funds in the [US Proposal's] case studies."

We note that as a result of our comments and those of other industry peers and trade associations, the SEC is re-considering this aspect of the US Proposal and is actively considering haircuts on notional amounts based on relative risk. We believe the CSA should engage with the SEC on this matter, given the SEC's relative expertise in this area and its experience through its own rule-making process. For your consideration, we attach as Appendix 1 a memorandum dated November 1, 2016 issued by the Division of Economic and Risk Analysis ("DERA") of the SEC analyzing the industry's proposals in that regard. While the DERA does not provide a recommendation, it is clear from their memorandum that there is much merit to the industry proposal and that it addressed the industry's concerns – which are virtually identical in Canada – in a manner that satisfies regulatory objectives.

In our view, the foregoing applies equally to the total leverage calculation contained in the Alternative Funds Proposal.

Returning to the specifics of the Alternative Funds Proposal, under proposed section 2.9.1, an investment fund's aggregate gross exposure, or leverage, must not exceed 3 times the investment fund's net asset value. The aggregate gross exposure calculation under subsection 2.9.1(2) is as follows:

(a) Aggregate value of the fund's indebtedness under any borrowing agreements; PLUS

(b) Aggregate market value of securities sold short by the fund; PLUS

(c) The aggregate notional amount of the investment fund's specified derivatives positions.

Based on the Notice, we understand that aggregate notional amount was selected due to simplicity (much as the SEC did). Unfortunately, while simple, it likely renders the new section ineffective as discussed above. Furthermore, while simple, it betrays a misunderstanding of derivatives and of global derivatives markets generally. It is important that Canada be consistent with the rest of the world in this regard due to the global nature of derivatives trading and the increasing reality that derivatives do not know national borders. From a fiduciary perspective, we want to get the best derivatives deal for our funds when we use derivatives but the complexities and uniqueness of NI 81-102 derivatives requirements often results in funds being constrained to use Canadian counterparties which, by definition, is a smaller market than the market for global counterparties. Global counterparties are more interested in business that is scalable which requires some similarity in rules. For a smaller market like Canada, if our rules are too dissimilar to those of the US or Europe, it simply becomes inefficient for non-Canadian counterparties to deal with Canadian investment funds and this results in higher spreads charged by Canadian counterparties. It seems obvious to us that this is simply a bad result for Canadian investors and regulation should not be the driver of higher costs to investors where there is no discernible benefit to incurring that cost or there are less costly means of achieving the same purpose.

Using aggregate notional amount in the leverage calculation does not reflect the commercial reality of the fund's exposure. Assume you have a $100 million fund that invests in only U.S. equities. The fund follows a hedging policy and hedges all of its exposure. Therefore, the notional amount of derivatives for that fund will be $100 million. But it does not really have $100 million at risk if the transaction is subject to netting and set-off provisions which is fairly commonplace. Its amount at risk is limited to the mark-to-market appreciation of its derivatives position or, in other words, its "exposure" as that term is used in subsection 2.7(4) of NI 81-102. It is not clear, therefore, why anything beyond exposure would be relevant for leverage calculation purposes.

Another way to look at this is using the example of a U.S. equity fund that fully hedges its U.S. dollar (USD) exposure to the Canadian dollar (CAD). If the Canadian and U.S. dollar are at par and remain as such, there would be no payment under the derivative and there would be no liability. Theoretically, the fund would owe the counterparty CAD 100 million and the counterparty would own the fund USD 100 million. Since in this example 1 USD = 1 CAD, the payments would be netted and no payment would be made, including in bankruptcy. Under proposed s.2.9.1, however, the fund would be considered to have 1 times leverage. As that leverage amount would be disclosed to investors under the Alternative Fund Proposal, the investor would be grossly misled.

It is not entirely clear why the CSA has chosen gross notional amount for this calculation. It appears to us that the CSA is equating the gross notional amount of a derivative with an outstanding amount of indebtedness in the sense that if the fund has a debt of $1 million outstanding, it is possible that the fund could be required to pay $1 million more than it has in assets which could, theoretically, lead the fund to "call" investors to put up more funds. This is contrary to the notion of mutual fund investing where your investment is the amount at risk. However, $1 million notional of derivatives does not have this same effect as long as proper documentation has been agreed by the parties to the transaction. Historically this was not always required in that not all derivatives transactions were subject to an ISDA agreement or other agreement with netting provisions; such is no longer the case as a result of the panoply of reforms to derivatives rules following the Global Financial Crisis in 2008-2009. Rather, the same effect is seen through the fund's "exposure" and that ought to properly be the input into the leverage calculation.

The difference between conventional mutual funds and alternative funds from an investor risk perspective is the risk of loss of capital and the general view that there is a greater likelihood of such risk in an alternative fund due either to illiquidity of underlying assets or through the use of derivatives. While we do not concede the validity of this concern, we note that what is important is ensuring that the potential loss for an investor is not more than their investment, i.e. there should never be a situation where the fund or a creditor has any recourse to an investor in a fund. In our view, therefore, this can be achieved by ensuring the aggregate exposure of derivative positions does not exceed 100% of NAV. By revising subsection 2.7(4) in this manner for alternative funds, the overall leverage ratio is simply not necessary. We note that under our alternative proposal, excess leverage beyond these amounts would still be permitted although an issuer could only do so through an offering memorandum and exempt distribution.

Another possible approach is to exclude from the gross notional amount used in the calculation, derivatives used for hedging purposes (which clearly are not used to lever the portfolio). While we do not believe that the total leverage limit is necessary at all given collateralization requirements and the widespread use of ISDA agreements, we would not object to such a limit if only the gross notional amount of speculative and/or non-collaterialized derivatives is used in the calculation. This would reinforce that the regulatory concern is the loss of investor capital for an amount greater than the investor's investment. At a minimum, derivatives used for hedging purposes must be excluded from the calculation.

The current definition of hedging is difficult to administer under the simplified approach to derivatives taken by many Canadian mutual funds. The major problem is clause (ii) of the definition as certain hedges are not simply correlation hedges, such as interest rate swaps. In our opinion, clauses (i) and (iii) together constitute an appropriate definition of hedging and if such were the definition in NI 81-102, it would be fairly simply to draft the proper exclusionary language for use in the calculation of the leverage limit. We note that the investment fund manager or portfolio manager, as the case may be, would still be obliged to prove to CSA members that that transaction is a hedge if scrutinized, but it would allow the flexibility to include hedges that are not direct offsets such as a currency hedge.

Question 11

In response to the CSA's question 11 in Appendix A, we believe there are many options that the CSA should consider.

As noted above, the CSA could retain the leverage ratio but replace notional amount with exposure for purposes of the calculation. This approach is consistent with the underlying concern – risk of loss – and is also consistent with the counterparty concentration limit in s.2.7(4) of NI 81-102 and is simple to calculate and monitor.

Alternatively, the CSA could proceed with the proposed leverage limits using notional amounts but with risk-based offsets in the calculation. This is the concept discussed by DERA in Appendix 1.

In the further alternative, the CSA could adopt a Value at Risk approach (combined with stress testing) which measures the maximum potential loss at a given confidence level over a specific timer period under normal market conditions. To this end, we quote at length from our US Comment Letter:

> If the Commission determines it must impose leverage limitations directly, Invesco believes that the Commission should adopt a risk-based metric coupled with stress testing and enhanced derivatives disclosures in lieu of imposing arbitrary leverage limits based on gross notional exposure. A VaR metric measures the maximum potential loss at a given confidence level (i.e., probability) over a specific time period under normal market conditions.
>
> Under the UCITS regime, a fund may use either a relative VaR or an absolute VaR approach. Under the relative VaR approach, the VaR of the UCITS fund's portfolio cannot be greater than twice the VaR of an unleveraged benchmark securities index.[1] Under an absolute VaR approach, a UCITS fund is limited to a VaR that is no greater than 20% of the UCITS fund's net assets (calculated using a 99% confidence level and a holding period of 20 days which is consistent with many regulatory schemes that use VaR).[2] The absolute VaR's 20% maximum limit was intended as a balanced approach, high enough to permit prudent risk taking yet low enough to provide 'guardrails' to prevent excessive market risk by UCITS funds.[3] Consistent with the UCITS approach,

[1] Id. at 124.

[2] Id. at 125, 138 and 141.

[3] See Feedback Statement on Committee of European Securities Regulators (CESR) Guidelines on Risk Measurement and the Calculation of Global Exposure and Counterparty Risk for UCITS, Ref.: CESR/10-798 (July28, 2010), at 13-14 (in providing feedback on the responses received to the consultation on CESR's Guidelines on Risk Measurement and the Calculation of Global Exposure and Counterparty Risk for UCITS, the CESR noted that, while respondents recommended that the calculation standards proposed for the VaR approach should be as high as between a 30% and 50%, the CESR determined that an appropriate maximum limit for the absolute VaR approach is not greater than 20%).

Invesco advocates allowing a fund to determine whether the relative VaR or absolute VaR approach is appropriate for a fund based on the fund's investment strategy.[4]

Firms and regulators across the globe acknowledge the benefits of the VaR metric. As the Commission noted as early as 1997 in its proposed release for capital and margin requirements for OTC derivatives dealers, many firms use VaR modeling to analyze, control and report their level of market risk. Various U.S. and global regulators also use VaR as a common risk measurement system and a minimum standard for capital adequacy of banks.[5] The primary benefits of VaR for investment advisers include facilitating consistent and regular monitoring of market risk and monitoring the extent to which hedging strategies are accomplishing their desired objectives.[6] In addition, VaR models can be compared across different markets and different exposures, are a universal metric that applies to all activities and to all types of risk, and can be measured at any level, from an individual trade or portfolio, up to a single enterprise-wide VaR measure covering all the risks in the firm as a whole.[7] When aggregated (to find the total VaR of larger portfolios) or disaggregated (to isolate component risks corresponding to different types of risk factors), VaR takes into account dependencies between the constituent assets or portfolios.[8] For these reasons, VaR analysis has become the standard risk management tool among many global firms and regulators. We therefore recommend that the Commission adopt a VaR approach similar to the UCITS guidelines for purposes of imposing limits on the amount of leverage a fund may obtain through the use of derivative instruments.

Invesco notes that many U.S. investment advisers offer products in the European markets, including UCITS funds subject to the VaR requirements (in particular, the relative VaR approach and the absolute VaR approach, as applicable). Adopting a VaR approach not only effectively limits potentially conflicting regulatory regimes for such firms but has the added benefit of enabling such firms to leverage existing infrastructure used by those UCITS funds to satisfy the risk limits applicable to the UCITS funds.

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[4] See, for example, the UCITS guidelines which provide that the relative VaR approach should be used by a fund employing investment strategies with a leverage-free benchmark whereas in contrast, the absolute VaR approach would be more suitable for a fund that invests in multiple asset classes and that defines its investment target in relation to an absolute return target, rather than to a benchmark.

[5] See Securities Exchange Act Release 34-39454 (December 17, 1997), at 33-34 ("Rules adopted recently by the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency, and the Federal Deposit Insurance Corporation (collectively, the "U.S. Banking Agencies") were designed to implement the [Basel Accord] for U.S. banks and bank holding companies. Appendix F [of this Release] is generally consistent with the U.S. Banking Agencies' rules, and incorporates the quantitative and qualitative conditions imposed on banking institutions.").

[6] Value at Risk for Asset Managers, Christopher L. Culp, Ron Mensink, CFA, and Andrea M.P. Neves, Derivatives Quarterly, Vol. 5, No. 2 (Winter 1998), at 28-29.

[7] Market Risk Analysis Volume IV: Value-at-Risk Models by Carol Alexander (2009), available at https://www.safaribooksonline.com/library/view/market-risk-analysis/9780470997888/11_chapter001.html

[8] Id.

ii. Applying Stress Testing as a Complement to VaR Analysis Addresses the Commission's Concerns Regarding the Shortcomings of VaR Analysis

Use of a VaR metric as a risk measurement and framework for leverage limits, coupled with stress-testing which is consistent with UCITS guidelines, fully addresses both the Commission's stated goals under the Proposal and the Commission's concerns regarding the use of the VaR approach. The Commission has expressed its concern that VaR cannot incorporate all possible risk outcomes, notably "tail risk."[9] However, as the Commission also noted, "stress testing is used increasingly as a complement to the more standard statistical models used for VaR analysis."[10] Stress testing serves as a valuable complement to VaR analysis and it directly addresses the Commission's reservations about a VaR approach.

Stress-testing provides risk managers with a clear idea of the vulnerability of a defined portfolio and measures the potential loss that may be suffered in a hypothetical scenario of crisis.[11] Complementing a VaR approach with ongoing stress testing requirements addresses the Commission's stated concerns about "tail risk" and VaR's dependence on the historical trading conditions during the measurement period, which may dramatically change between stressed conditions and benign trading conditions.

Regulators and a large segment of the investment management industry have also developed stress testing tools for their own monitoring purposes.[12] Stress testing plays an important role in Invesco's risk management and in all stages of Invesco funds' investment process, including risk allocation, internal limit setting and hedging, for our

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[9] Proposal at 126-127; compare Proposal at 346 ("[the Commission's] concern with respect to an absolute VaR method is that the calculation of VaR on a historical basis is highly dependent on the historical trading conditions during the measurement period and can change dramatically both from year to year and from periods of benign trading conditions to periods of stressed market conditions").

[10] Federal Reserve Bank of San Francisco Economic Letter at 1; see also, Invest. Mgmt. and Financial Innovations Paper, at 72 ("In general, the Stress-Testing exercise always implies a higher level of risk measured in terms of VaR").

[11] Applying Stress-Testing On Value at Risk (VaR) Methodologies, Investment Management and Financial Innovations, José Manuel Feria Domínguez, María Dolores Oliver Alfonso (April 2004), at 62, available at http://businessperspectives.org/journals_free/imfi/2004/imfi_en_2004_04_Dominguez.pdf; see also, Stress Testing in the Investment Process, Ruban, Oleg A. and Melas, Dimitris and MSCI Inc. (August 3, 2010), at 2 ("Stress tests explore the tails of the loss distribution by looking at the extent of potential large portfolio losses and possible scenarios in which these losses can occur. Stress tests help identify and manage situations that can result in extreme losses."), available at http://dx.doi.org/10.2139/ssrn.1708243

[12] See, e.g., Federal Reserve Bank of San Francisco Economic Letter at 2-3 ("the Federal Deposit Insurance Corporation uses a stress-testing model to identify depository institutions that are potentially vulnerable to real estate markets. The model is calibrated to the New England real estate crisis of the early 1990s, which caused the closure of several depository institutions. With regard to interest rate risk, the Federal Reserve System maintains a duration-based valuation model that examines the impact of a 200-basis-point increase in rates on bank portfolio values. (internal citation omitted) The model can be used to detect banks that would appear to be the most vulnerable to rising interest rates.").

U.S. registered investment company products, among other investment products. Broadly speaking, risk managers can develop a stress-testing exercise in various ways:

Historical Scenarios of Crisis: Scenarios are chosen from historical disasters such as the US stock market crash of October 1987, the bond price falls of 1994, the Mexican crisis of 1994, the Asian crisis of 1997, the Argentinean crisis of 2001, financial crisis of 2007 - 2009, etc.

Stylized Scenarios: Simulations of the effects of some market movements in interest rates, exchange rates, stock prices and commodity prices on the portfolio. These movements are expressed in terms of both absolute and relative changes, such as:

- Parallel yield curve in ±100 basis points
- Stock index changes of ±20%
- Currency changes of ±10%
- Commodity changes of ±40%
- Volatility changes of ±20%

Hypothetical Events: A reflection process in which we consider the potential consequences of certain hypothetical situations such as an earthquake, an international war, a terrorist attack, etc.[13]

The key advantage of stress tests under scenarios (such as the three above) is that they link a loss to a specific event, which can be more meaningful to portfolio managers than a summary statistic of the loss distribution.[14] Under the UCITS guidelines, a fund that uses the VaR approach should design its risk management process to include a rigorous, comprehensive and risk adequate stress-testing program. The stress-testing program should be designed to measure any potential major depreciation of the UCITS fund's value as a result of unexpected changes in the relevant market parameters and correlation factors.

Similarly, the Commission could prescribe various historical periods and various prescribed shocks, such as the shocks indicated under the above "Stylized Scenarios" and investment advisers could, where necessary and based upon the results of the stress-testing, make appropriate portfolio adjustments. Indeed, VaR used in isolation as

[13] Applying Stress-Testing On Value at Risk (VaR) Methodologies, Investment Management and Financial Innovations ("Invest. Mgmt. and Financial Innovations Paper"), José Manuel Feria Domínguez, María Dolores Oliver Alfonso (April 2004), at 62-63, available at http://businessperspectives.org/journals_free/imfi/2004/imfi_en_2004_04_Dominguez.pdf

[14] Stress Testing in the Investment Process, Ruban, Oleg A. and Melas, Dimitris and MSCI Inc. (August 3, 2010), at 2, available at http://dx.doi.org/10.2139/ssrn.1708243

a risk metric could be limiting, as the Commission observed.[15] This is why "stress-testing is used increasingly as a complement to the more standard statistical models used for VaR analysis."[16] Accordingly, use of a VaR metric as a risk measurement and framework for leverage limits, coupled with stress-testing which is consistent with UCITS guidelines, fully addresses both the Commission's stated goals under the Proposal and the Commission's concerns regarding the use of the VaR approach.

By opting for simplicity over these alternatives, the CSA risks exhibiting a lack of understanding of derivatives, how they work, and the risks to which they give rise. Given the nature of derivatives trading and the volumes in other countries, it is not clear why the CSA feels the need for Canada to come up with yet another approach that does not align with the rest of the world. We find it odd that in the recent CSA Consultation Paper 33-404, one of the reasons for proceeding with those proposals was that, internationally, "best interests standard" is the way regulators are moving. While we did not agree with that as a rationale for proposals relating to a best interests standard, we do think it is wrong to ignore international developments without a full understanding of them. We note that the U.S. and Europe, as compared to Canada, are clear leaders in derivatives trading and we should take advantage of the thought leadership offered by those jurisdictions.

Concentration Limits

In response to the CSA's question 3 in Appendix A of the Notice, while satisfied with a 20% concentration limit, we would prefer a limit of 25% which is consistent with the asset diversification requirements of the U.S. tax code and U.S. practice. For firms that operate in both countries, the benefits of this type of consistency is that the same strategies can be run for clients in both countries and sometimes through the same investment pool (subject to discretionary relief) which creates scale. We are all aware that investment fund fees are a major issue for regulators and we observe that increased scale creates a more likely set of conditions under which a mutual fund manager might reduce management fees.

We do not support the adoption of a hard cap as is currently the case for investments in illiquid assets. From a philosophical perspective, it is not clear what the hard cap offers. If the same approach is followed for illiquid assets, then the hard cap would presumably be 25%, implying that a fund can have investments in as few as 4 issuers, rather than the 5 issuers implied by a 20% cap. The benefit of the additional issuer from a diversification perspective is negligible and, as such, the additional limit does not materially impact investor protection yet it entails an additional item to monitor for compliance, which itself entails a cost. Clearly the underlying philosophy for this aspect of the Alternative Funds Proposal is that excessive concentration is fine. Once that philosophical issue has been resolved, further limits cannot really be justified. As such, we oppose an absolute cap on portfolio concentration.

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[15] See footnote 9, *supra*.

[16] Federal Reserve Bank of San Francisco Economic Letter at 1; see also, Invest. Mgmt. and Financial Innovations Paper, at 72 ("In general, the Stress-Testing exercise always implies a higher level of risk measured in terms of VaR").

Limit on Illiquid Assets

In response to the CSA's question 4 in Appendix A of the Notice, we agree that there should not be a higher limit on illiquid assets for alternative funds. In our opinion, limits on illiquid assets are necessary for a product that offers daily liquidity and there is no reason to believe that liquidity needs of alternative funds are different from those of mutual funds.

In response to the CSA's question 5 in Appendix A of the Notice, while we do not have any suggestions, we would note that if liquidity is other than daily, then the amount of liquidity need not be as high as if it were daily. If the alternative fund can choose their liquidity terms, those with less liquidity should have higher limits on illiquid assets.

In response to the CSA's question 6 in Appendix A of the Notice, we do not agree that non-redeemable investment funds should have a limit on illiquid assets since these funds are, by definition, non-redeemable. We understand that illiquid asset limits are necessary to ensure that a conventional mutual fund is able to meet liquidity demands. This issue simply does not arise for non-redeemable investment funds.

In response to the CSA's question 7 in Appendix A, please refer to our response above regarding question 5 as it is the same issue.

We trust that are comments are helpful. We would be pleased to discuss our comments further should you so desire.

Yours very truly,

Invesco Canada Ltd.

Eric Adelson
Senior Vice President, Head of Legal – Canada

MEMORANDUM

To: File S7-24-15, Use of Derivatives by Registered Investment Companies and Business Development Companies

From: The Division of Economic and Risk Analysis[1]

Date: November 1, 2016

Re: Risk Adjustment and Haircut Schedules

Many commenters on proposed rule 18f-4 suggested that the rule should measure a fund's derivatives exposure using notional amounts adjusted to reflect the risks of the underlying reference assets. These commenters suggested that the Commission adopt risk-based adjustments derived from standardized schedules used for other regulatory purposes. Many commenters also suggested that a fund be permitted to maintain as qualifying coverage assets a range of assets in addition to cash and cash equivalents, subject to "haircuts" to the value of these additional assets identified in standardized schedules included in other regulatory requirements. In light of these comments, DERA staff analyzed the regulatory requirements most frequently identified by commenters.

This memorandum sets out the methods by which DERA staff performed its analysis and the results thereof. The Commission has expressed no view regarding any specific risk-based adjustments, or our analysis or its results.

1. Summary of Existing Schedules on Margin Requirements

First, we summarize the standardized schedules most frequently identified by commenters and which commenters suggested could be used to derive risk-based adjustments to notional amounts for purposes of rule 18f-4[2]: the schedules used in the final rules for margin requirements for uncleared swaps adopted by the prudential regulators and the Commodity Futures Trading Commission (PR and CFTC, respectively).[3] These schedules are consistent with the schedule

[1] This is a memo by the Staff of the Division of Economic and Risk Analysis of the U.S. Securities and Exchange Commission. The Commission has expressed no view regarding the analysis, findings or conclusions contained herein.

[2] *See, e.g.*, Comment Letter of the Investment Company Institute (July 28, 2016), *available at* https://www.sec.gov/comments/s7-24-15/s72415-244.pdf ("ICI July 28, 2016 Comment Letter") (proposing a schedule based on the PR/CFTC schedule) ; Comment Letter of the Investment Adviser Association (Aug. 18, 2016), *available at* https://www.sec.gov/comments/s7-24-15/s72415-250.pdf (while opposing portfolio limitations entirely, supporting the PR/CFTC-based schedule provided by the ICI); Comment Letter of James A. Overdahl, Delta Strategy Group (Mar. 24, 2016), *available at* https://www.sec.gov/comments/s7-24-15/s72415-85.pdf (suggesting the PR schedule as one possibility).

[3] Margin and Capital Requirements for Covered Swap Entities, 80 FR 74839 (Nov. 30, 2015), *available at* https://federalregister.gov/a/2015-28671; Margin Requirements for Uncleared Swaps for Swap Dealers and Major Swap Participants, 81 FR 635 (Jan. 6, 2016), *available at* https://federalregister.gov/a/2015-32320.

for the margin requirements for non-centrally cleared derivatives published by the Bank for International Settlements (BIS), which some commenters also suggested could form a basis for adjustments to notional amounts for purposes of rule 18f-4, and so we analyze all three schedules (collectively, the "regulatory schedules") together.[4]

These sources generally provide standard margin schedules organized by reference asset class, including the asset classes most frequently discussed by commenters.[5]

Table 1. Summary of PR/CFTC/BIS Schedules

Asset Class	*Initial Margin Requirement*[a]
Credit: 0–2y duration	2%
Credit: 2–5y duration	5%
Credit 5+y duration	10%
Commodity	15%
Equity	15%
Foreign exchange	6%
Interest rate: 0–2y duration	1%
Interest rate: 2–5y duration	2%
Interest rate: 5+y duration	4%

[a] Expressed as % of notional exposure

As depicted in Table 1, the initial margin schedules set by the PR, CFTC, and BIS are identical for all reference asset classes analyzed.

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[4] Basel Committee on Banking Supervision, Board of the International Organization of Securities Commissions (Mar. 2015), *available at* http://www.bis.org/publ/bcbs261.pdf; *see, e.g.*, Comment Letter of the Securities Industry and Financial Market Association (Mar. 28, 2016), *available at* https://www.sec.gov/comments/s7-24-15/s72415-174.pdf (primarily supporting BIS schedule).

[5] We do not analyze specific types of derivatives transactions, and thus do not analyze cross currency swaps, which are included in the PR/CFTC schedules but are not included in the BIS schedule.

2. Risk Analyses and Comparisons

To evaluate commenters' suggestions regarding these standardized schedules, we assess how they relate to the risks of the underlying reference assets. We use the PR and CFTC schedules, and the BIS schedule, as the main reference point because they were most frequently identified by commenters and provide identical values for all of the asset classes analyzed below.[6]

2.1. U.S. Treasury Securities

Commenters suggested two different means of risk-adjusting the notional values for interest rate derivatives. These are discussed below.

2.1.1. Risk Comparisons of the Existing Schedules

Because the regulatory schedules provide that the highest amount of initial margin applies to equity derivatives, the volatility of large capitalization equity securities can be used as a baseline against which to compare the other asset classes in the schedule.[7] To evaluate the suggested risk adjustments for interest rate ("IR") derivatives, we first determine the relative risk of U.S. Treasury securities as compared to domestic large capitalization equity securities. We compute risk levels (*i.e.*, monthly standard deviations) using monthly total returns of the S&P 500 and the Barclays Treasury Series from January 1997 to July 2016, for which we have data available.[8] We then divide the standard deviation of the U.S. Treasury securities by the standard deviation of the S&P 500 to compute the risk ratios. Table 2 summarizes the results.

[6] The risk analyses performed here are based on indexes rather than individual securities. We believe that the analyses should generally capture the relative risk across various asset classes.

[7] The initial margin requirements in the regulatory schedules are expressed as a percentage of notional amounts, which are subject to additional calculations to determine initial margin amounts to be collected under the applicable regulatory margin requirements. The regulatory schedules provide that the highest amount of initial margin also must be collected for commodity derivatives. A comparison of S&P 500 and two commonly used commodity indexes (the Bloomberg and the S&P GSCI commodity indexes) indicates that commodities have a similar or somewhat higher risk level as compared to equity securities.

[8] To understand whether the risk ratios we calculated would be materially different under different sets of market conditions, including during periods of financial stress, we perform these analyses using data from 2008-2010. We obtain similar findings, which are provided in the appendix. Data for the S&P 500 are obtained from Morningstar. Data for all Treasury and corporate bond series are obtained from Datastream.

Table 2. Risk Analyses for U.S. Treasury vs Equity Securities

	(1)	*(2)*	*(3)*	*(4)*
Asset Class	*Risk Level (standard deviation of historical returns)*	*Initial Margin Requirement under PR/ CFTC/BIS schedules*	*Risk Ratio implied by PR/CFTC/BIS schedules*[a]	*Risk Ratio computed relative to Equity risk level*
Equity	4.45	15%	100%	100%
Treasury IR: 0–2y	0.27[b]	1%	7%	6%
Treasury IR: 2–5y	0.62[c]	2%	13%	14%
Treasury IR: 5+y	2.48[d]	4%	27%	56%

[a] Computed as the initial margin requirement of an asset class divided by the initial margin requirement of equity (15%)
[b] Computed using interest rate of Treasury 0-3 months and 1-2 years
[c] Computed using interest rate of Treasury 1-5 years
[d] Computed using interest rate of Treasury 5-10, 10-20, and 20+ years

Historical risk levels and risk ratios implied by the PR, CFTC, and BIS schedules for equity (S&P 500 as proxy) and various Treasury securities are reported in Columns 1 and 2 of Table 2. The implied risk ratio from the existing regulatory schedules (initial margin of an asset class divided by initial margin requirement for equity) is reported in Column 3. Commenters suggested that these implied risk ratios can be used as the multipliers to calculate risk-adjusted notional amounts for purposes of rule 18f-4.[9] Column 4 reports realized risk ratios calculated by the ratio between the historical volatility of the Treasury series and the historical volatility of the S&P 500.

Comparing columns 3 and 4, we observe that for short-term Treasury securities (2 years or less), the margin schedules are roughly consistent with the underlying risk levels of the reference assets. We compute a risk ratio of 6%, as compared to the 7% implied from the PR, CFTC, and BIS schedules.

For medium-term U.S. Treasury securities, the ratios are also consistent, although due to data availability our series is for 1 to 5 years, rather than 2 to 5 years as in the regulatory schedules.[10,11]

[9] *See supra* footnotes 2 & 4.

[10] Please also note that BIS and CFTC schedules classify interest rate derivatives using duration rather than maturity. For most U.S. Treasury securities (up to 10 years), durations are fairly close to actual maturities (*e.g.*, for 1 year U.S. Treasury securities, duration is 0.96; for 5 year U.S. Treasury securities, duration is 4.85). Therefore, using maturity as a substitute for duration in this analysis will have a minimal impact on our comparisons using maturity-based series.

For long-term U.S. Treasury securities with maturities exceeding 5 years, our analyses indicate a higher calculated risk ratio (56%) versus what is implied by the PR, CFTC, and BIS schedules (27%). We note, however, that if long-term U.S. Treasury securities refer to those with mainly 5 to 10 year maturities, our risk analyses yield a risk ratio of 36%, which is closer to these schedules.

2.1.2. Reference Bond

Commenters suggested in the alternative that rule 18f-4 should permit funds to adjust the amount of interest rate derivatives by normalizing them to a specified reference bond. Some commenters suggested that the 10-year Treasury bond would be an appropriate reference bond, whereas others suggested the appropriate reference bond would be the 30-year Treasury bond because these commenters asserted that the 30-year Treasury bond has a level of volatility roughly comparable to that of equity markets.[12]

Using data from 1980 to 2016, we compute the risk levels of these asset classes and find that this methodology suggests that the relative risk level for the 30-year Treasury bond is 86% of the S&P 500, while the relative risk level for the 10-year Treasury bond is 55%.

Table 3. 10-year vs 30-year Treasury Bond Risk

	S&P500	*30-year Treasury*	*10-year Treasury*
Risk (std. dev.)	4.35	3.74	2.38
Risk Ratio	1	0.86	0.55

2.2. Credit Derivatives

Credit derivatives can be exposed to either both default risk and interest rate risk or to predominantly default risk. We first evaluate commenters' suggested adjustments for credit derivatives based on regulatory schedules by analyzing how the risk of corporate debt compares to the risk of equity. Then, we investigate credit derivatives that predominantly are exposed to default risk by comparing the risk of credit default swaps ("CDS") relative to the risk of equity.

[11] For the consistency of the analyses, we used U.S. Treasury series from Barclays obtained from Datastream. This data source is only available in a 1 to 5 year series, and a 2 to 5 year series cannot be separately derived from it.

[12] *See, e.g.* Comment Letter of Guggenheim Investments, *available at* https://www.sec.gov/comments/s7-24-15/s72415-163.pdf; Comment Letter of Pacific Investment Management Company LLC, *available at* https://www.sec.gov/comments/s7-24-15/s72415-168.pdf ("PIMCO Comment Letter"); Comment Letter of Capital Research and Management Company, *available at* https://www.sec.gov/comments/s7-24-15/s72415-153.pdf.

2.2.1. Corporate Debt

Table 4 reports risk levels using total returns of the S&P 500 and the indexes of the AAA- and BBB- rated bonds from 2004 to 2016, the period for which we have data available.

Table 4. Risk Analyses for Corporate Debt vs Equity

	(1)	*(2)*	*(3)*	*(4)*
Asset Class	*Risk Level (standard deviation of historical returns)*	*Initial Margin Requirement under PR/CFTC/BIS schedules*	*Risk Ratio implied by PR/CFTC/BIS schedules*	*Risk Ratio computed relative to Equity risk level*
Equity	4.09	15%	100%	100%
Credit: 0–2y duration	0.70[a]	2%	13%	17%
Credit: 2–5y duration	1.33[b]	5%	33%	33%
Credit 5+y duration	2.46[c]	10%	67%	60%

[a] Computed using AAA and BBB 1-3 years
[b] Computed using AAA and BBB 3-5 years and 5-7 years
[c] Computed using AAA and BBB 7-10, 10-15 and 15+ years

The implied risk ratios are, again, computed as the initial margin requirement for an asset class divided by the initial margin requirement for equity. Comparing columns 3 and 4, we observe that the implied risk adjustment ratios and the ratios we computed from the risk analyses are generally consistent for all three maturity categories.[13] For the short-term credit category, our analyses indicate that the PR, CFTC, and BIS schedules have an implied risk ratio that is slightly lower than the risk ratio computed, while for the long-term category, the risk ratio implied from the schedules is slightly higher. To evaluate a comment regarding adjusting risk on a continuum rather than by bucketing instruments together,[14] we note that dividing duration by 10 times 100% results in a continuum of risk ratios that is generally consistent with the risk adjustments in the regulatory schedules.[15]

[13] The maturities used in our risk analyses are slightly higher in order to provide for a comparable comparison between the values included in the regulatory schedules, which are determined on the basis of duration, and the values used in our analyses, which are based on the relevant securities' maturities.

[14] PIMCO Comment Letter (noting that a duration adjustment to a specified reference bond adjusts risk on a continuum rather than bucketing instruments with different risk characteristics together).

[15] For durations between 0.25 years and 2 years, between 2 years and 5 years, and between 5 years and 10 years, the adjusted risk ratios are between 2.5% and 20%, between 20% and 50%, and between 50% and 100%, respectively.

2.2.2. Credit Default Swaps

To evaluate the risk of CDS we compute standard deviations of CDS returns.[16] Table 5 reports the risk levels of returns of the CDX CDS index obtained from Capital IQ Inc. and those of total returns of the S&P 500 index. The data cover the period from 2008 to 2014, for which the CDS data is available.[17]

The table shows that returns for CDS contracts referencing high yield corporate debt are more volatile than those for CDS referencing investment grade corporate debt.[18] The CDS contracts that exhibit the highest risk level are those for high yield CDS with a tenor of 10 years.[19] The returns to these CDS have a standard deviation of 1.16 % per month and their risk ratio relative to equities is 24%.

Table 5. Risk Analyses for CDS vs Equity

		(1)	*(2)*
Asset Class		*Risk Level (standard deviation of historical returns)*	*Risk Ratio computed relative to Equity risk level*
Equity (S&P 500)		4.86	100%
CDS, investment grade	1y tenor	0.02	0%
	5y tenor	0.18	4%
	10y tenor	0.31	6%
CDS, high yield	1y tenor	0.29	6%
	5y tenor	0.84	17%
	10y tenor	1.16	24%

[16] Standard deviations are computed from daily data and scaled to monthly frequency using the square root of the average number of daily observations per month during the sample.

[17] CDS returns are computed as -Δ(CDS Spread)×PV01, where PV01 is the change in the value of the CDS contract, relative to the notional amount of the CDS, for a one percentage point increase in the CDS spread.

[18] In this table, we are not reproducing the initial margin requirements under the PR/CFTC/BIS schedules and the risk ratios implied by PR/CFTC/BIS schedules because the schedules do not distinguish between investment grade and high-yield corporate debt.

[19] In recommending how funds would use the PR/CFTC schedule, one commenter distinguished the way that funds should calculate the risk adjustment for credit default swaps from the calculation for other credit derivatives, suggesting that for credit default swaps, funds use the maturity or tenor of the swap, while for other derivative instruments, funds use the duration of the underlying reference asset. *See* ICI July 28, 2016 Comment Letter.

2.3. Currency

To understand the risk of currency, we estimate currency risk using the Nominal Broad Dollar Index, obtained from the Federal Reserve Board website.[20] The broad index is a weighted average of the foreign exchange values of the U.S. dollar against the currencies of a large group of major U.S. trading partners.[21]

We compare the risk of currency to the risk of the S&P 500 index from 1973 to July 2016, the period for which we have data for both data series. We follow the same approach discussed above by dividing the standard deviation of this currency basket by the standard deviation of the S&P 500. The comparison yields a risk adjustment multiplier of 29%, as compared to the 40% multiplier implied by the PR, CFTC, and BIS schedules. The schedules are broadly consistent with our analysis, which is based on a broad currency index that is highly diversified. This analysis, however, does not address whether narrower groupings of currencies or particular currencies would yield different risk adjustment multipliers.

3. Haircut Schedule

In addition to risk-based notional amount adjustments, commenters also suggested that the final rule permit funds to maintain high quality and liquid assets in addition to cash and cash equivalents as qualifying coverage assets.[22] Many commenters also suggested that the haircuts applicable to these assets be determined pursuant to the schedule of assets that may be used to satisfy the PR and CFTC margin requirements for uncleared swaps.[23] In light of these comments, we summarize assets that may be used to satisfy these margin requirements and analyze these assets and their corresponding haircuts in light of historical risk levels across certain asset classes.

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[20] The data is available from Federal Reserve Board website at http://www.federalreserve.gov/datadownload/Choose.aspx?rel=h10.

[21] For details on the construction of the index, see the article in the Winter 2005 Federal Reserve Bulletin, available at http://www.federalreserve.gov/pubs/bulletin/2005/winter05_index.pdf.

[22] *See* SIFMA Letter, *supra* note 2, at 29.

[23] *See id.*; *see also* ICI July 28, 2016 Comment Letter; Comment Letter of the US Chamber of Commerce (Mar. 28, 2016), *available at* https://www.sec.gov/comments/s7-24-15/s72415-148.pdf; Comment Letter of Vanguard (Mar. 28, 2016), *available at* https://www.sec.gov/comments/s7-24-15/s72415-162.pdf.

Table 6. Margin Values for Eligible Noncash Margin Collateral from PR/CFTC Schedules

Asset Class	*Discount %*
Eligible government and related (e.g., central bank, multilateral development bank, GSE securities identified in §23.156(a)(1)(iv)) debt[1]: residual maturity less than one-year.	0.5
Eligible government and related (e.g., central bank, multilateral development bank, GSE securities identified in §23.156(a)(1)(iv)) debt[1]: residual maturity between one and five-years	2.0
Eligible government and related (e.g., central bank, multilateral development bank, GSE securities identified in §23.156(a)(1)(iv)) debt[1]: residual maturity greater than five-years	4.0
Other eligible publicly traded debt[2,3]: residual maturity less than one year	1.0
Other eligible publicly traded debt[2,3]: residual maturity between one and five years	4.0
Other eligible publicly traded debt[2,3]: residual maturity greater than five years	8.0
Equities included in S&P 500 or related index	15.0
Equities included in S&P 1500 Composite or related index but not S&P 500 or related index[24]	25.0

[1] This category includes any security that is issued by, or fully guaranteed as to the payment of principal and interest by, the European Central Bank or a sovereign entity that is assigned no higher than a 20 percent risk weight under the capital rules applicable to the covered swap entity, or an OECD Country Risk Classification rating of 0-2.

[2] This category includes corporate and municipal debt securities that are investment grade, as defined by the prudential regulators.

[3] Note that GSE debt securities not identified in §23.156(a)(1)(iv) receive the same discounts as Other eligible publicly traded debt.

First, to understand how the schedule of assets that may be used to satisfy the PR and CFTC margin requirements for uncleared swaps relates to the underlying risk of certain margin-eligible assets, Table 7 reports haircut discounts computed based on historical risk levels of various asset classes and compares them to the schedules. The risk ratios reported in the table are calculated by dividing the standard deviation of the given reference asset by the standard deviation calculated for the S&P 500. The haircut discounts are then computed by multiplying that risk ratio by the haircut (15%) set for the S&P 500.[25]

[24] We did not analyze the risk associated with the S&P 1500 due to data limitations.

[25] Our review of Table 6 does not seek to analyze the entire PR/CFTC schedule, but rather to examine common categories of assets (U.S. Treasury securities, corporate debt, and equity).

Table 7. Haircut Schedule Based on Risk

		(1)	*(2)*	*(3)*	*(4)*	*(5)*
Asset Class		*Risk Level (standard deviation of historical returns)*	*Haircut/ Discount under PR/CFTC schedules*	*Risk Ratio implied by PR/CFTC schedules*	*Risk Ratio computed relative to Equity risk level*	*Haircut/ Discount Computed*[e]
Treasury[a,b]	<1yr	0.18	0.5	3%	4%	0.6
	1-5yr	0.62	2	13%	14%	2.1
	>5yr	2.48	4	27%	56%	8.4
Corporate[c,d]	<1yr	—[g]	1	7%	—[g]	—[g]
	1-5yr	0.90	4	27%	22%	3.3
	>5yr	2.24	8	53%	55%	8.3
Equity (S&P 500)		4.45[f] (4.09)	15	100%		

[a] The securities in the regulatory schedule are defined as eligible "government and related"
[b] The risk is computed using U.S. Treasury series from 1997 to 2016
[c] The securities in the regulatory schedule are defined to include certain eligible "publicly traded debt"
[d] The risk is computed using AAA and BBB corporate bond series from 2004 to 2016. The risk of corporate 1-5 year series is computed using 1-3 and 3-5 year corporate series
[e] Haircut Discount Computed = Risk Ratio Computed × Equity Haircut = Risk Ratio Computed × 15
[f] The risk levels of equity (S&P 500) are 4.45% from 1997 to 2016 and 4.09% from 2004 to 2016
[g] Due to data limitations, we do not analyze risk of corporate debt with maturity of less than 1 year

Comparing the existing discounts, or haircuts, reported in column 2 and the discounts based on risk levels reported in the last column, we observe that the existing haircut schedule generally is consistent with the underlying risk levels of the reference assets. The risk level of the long-term U.S. Treasury securities, however, based on historical risk levels, is higher than the risk level implied in the existing haircut schedule (i.e., 56% vs 27% as compared to equity). We note, however, that if we focus on the 5–10 year U.S. Treasury series, our risk analyses indicate a 35% risk ratio and a 5.3 haircut/discount, which are roughly consistent with the existing schedule.[26]

[26] Note also that corporate debt securities included in this analysis only consist of AAA and BBB bonds; high-yield categories are not included so as to facilitate the comparison with the existing schedule. Therefore, the risk differences between corporate and Treasury securities appear small, especially for the long-term maturity series. But our analyses show that high-yield bonds are more than twice as risky as comparable Treasury securities.

In addition, the 15% discount for domestic large capitalization equities is used in our analyses as a benchmark to compare risk levels and set the schedule. To understand whether this discount level is consistent with the observed volatility of large capitalization domestic equities, we further perform VaR tests on the S&P 500. These allow us to understand how much equity value can be expected to be lost under extreme conditions. Using monthly data from the past four decades, we observe that 1% of the time, the S&P 500 index can be expected to lose more than 11% in value over a month (*i.e.*, approximately 20 trading days). The haircut schedule included in the PR and CFTC rules for uncleared swaps is generally consistent with this analysis, in that it provides for a 15% haircut for large cap equity securities and provides a greater haircut of 25% for other equity securities that generally would be expected to experience greater volatility.

4. Risk Analyses for Crisis Periods

To further understand whether the values in the regulatory schedules are consistent during crisis periods when market volatility increases, we perform the above risk analyses using data from 2008 to 2010. Overall, the risk ratios among various asset classes stay roughly consistent with those found in the overall sample. The detailed results are attached in the appendix.

Appendix: Risk Analyses during 2008-2010

A.1. Risk Analyses for U.S. Treasury Securities vs Equity

	(1)	*(2)*	*(3)*	*(4)*
Asset Class	*Risk Level (standard deviation of historical returns)*	*Initial Margin Requirement under PR/ CFTC/BIS schedules*	*Risk Ratio implied by PR/CFTC/BIS schedules*[a]	*Risk Ratio computed relative to Equity risk level*
Equity	6.40	15%	100%	100%
Treasury IR: 0–2y	0.25[b]	1%	7%	4%
Treasury IR: 2–5y	0.80[c]	2%	13%	12%
Treasury IR: 5+y	3.62[d]	4%	27%	57%

[a] This is computed as initial margin requirement divided by the initial margin requirement of equity (15%).
[b] Computed using interest rate of Treasury 0-3 months, 1-2 years
[c] Computed using interest rate of Treasury 1-5 years
[d] Computed using interest rate of Treasury 5-10, 10-20, and 20+ years

A.2. Risk Analyses for Corporate Debt vs Equity

	(1)	*(2)*	*(3)*	*(4)*
Asset Class	*Risk Level (standard deviation of historical returns)*	*Initial Margin Requirement under PR/CFTC/BIS schedules*	*Risk Ratio implied by PR/CFTC/BIS schedules*	*Risk Ratio computed relative to Equity risk level*
Equity	6.40	15%	100%	100%
Credit: 0–2y duration	1.27[a]	2%	13%	20%
Credit: 2–5y duration	2.25[b]	5%	33%	35%
Credit 5+y duration	3.91[c]	10%	67%	61%

[a] Computed using AAA and BBB 1-3 years
[b] Computed using AAA and BBB 3-5 years and 5-7 years
[c] Computed using AAA and BBB 7-10, 10-15 and 15+ years

A.3. Haircut Schedule Based on Risk

		(1)	(2)	(3)	(4)	(5)
Asset Class		*Risk Level (standard deviation of historical returns)*	*Haircut/ Discount under PR/CFTC schedules*	*Risk Ratio implied by PR/CFTC schedules*	*Risk Ratio computed relative to Equity risk level*	*Haircut/ Discount Computed*[b]
Treasury[a,b]	<1yr	0.08	0.5	3%	1%	0.2
	1-5yr	0.80	2	13%	12%	1.9
	>5yr	3.62	4	27%	57%	8.5
Corporate[a]	<1yr	—	1	7%	—	—
	1-5yr[c]	1.56	4	27%	24%	3.7
	>5yr	3.59	8	53%	56%	8.4
Equity (S&P 500)		6.40	15	100%		

[a] Computed using AAA and BBB series

[b] Haircut Discount Computed = Risk Ratio Computed × Equity Haircut = Risk Ratio Computed × 15

[c] Computed using 1-3 and 3-5 year corporate series