



IFRS 17 SERIES

Author

Cassandra Hannibal, FIA CERA
Moody's Analytics Research

Contact Us

Americas
+1.212.553.1658
clientservices@moodys.com

Europe
+44.20.7772.5454
clientservices.emea@moodys.com

Asia (Excluding Japan)
+852.2916.1121
clientservices.asia@moodys.com

Japan
+81.3.5408.4100
clientservices.japan@moodys.com

Equivalent Confidence Level for the IFRS 17 Risk Adjustment

Executive Summary

International Financial Reporting Standard (IFRS) 17 introduces the concept of a risk adjustment for non-financial risk. The IFRS 17 risk adjustment is an influential factor in the pricing of insurance contracts and in how profit from insurance contracts is reported and emerges over time. While the risk adjustment must satisfy certain conditions, the method for its calculation is not prescribed and is the choice of the insurer. As such, there are many potential methods of calculation.

This paper is the third in a series designed to provide an introduction to different features of the risk adjustment that should be considered before implementation. This paper does not attempt to address all the challenges in choosing and implementing a calculation methodology, but focuses on the specific issues around calculating an equivalent confidence level for the IFRS 17 risk adjustment when a method other than Value-at-Risk (VaR) is used. The methodology is important, as in the extreme case, two identical insurers with the same policies and same risk adjustment methodology might disclose different equivalent confidence levels for the same IFRS 17 risk adjustment, solely because the translation methodology is different.

The paper opens with a simple case study to illustrate the methods described in the subsequent sections. The paper concludes with a summary including issues to consider.

CONTENTS

1. Introduction	03
2. Case study	03
3. Method 1 – Assumed distribution for PVCFs	03
4. Method 2 – Assumed distribution for non-financial risk	06
5. Conclusions.....	07
6. References.....	07

1. Introduction

Under IFRS 17 the risk adjustment for non-financial risk is “...the compensation an entity requires for bearing the uncertainty about the amount and timing of the cash flows that arises from non-financial risks as the entity fulfils insurance contracts.”¹ The calculation method is not prescribed and is the choice of the insurance company, subject to the principles detailed in paragraphs B91 and B92² of the standard. As the methodology for the risk adjustment for non-financial risk is regarded as a significant judgment, the approach used must be disclosed. In addition:

“...An entity shall disclose the confidence level used to determine the risk adjustment for non-financial risk. If the entity uses a technique other than the confidence level technique for determining the risk adjustment for non-financial risk, it shall disclose the technique used and the confidence level corresponding to the results of that technique...”³

We interpret the “confidence level” referred to here as the probability that the change in the Present Value of Future cash flows (PVCFs) over a one-year horizon will be lower than the risk adjustment (under changes to non-financial risks only). So the entity can either choose a confidence level and derive a risk adjustment (using the confidence level, or VaR, technique) or use another technique to calculate a risk adjustment and then translate this into an associated confidence level. Either way, the entity must take a view of the distribution of the change in PVCFs over a one-year horizon. In this paper, we consider two different methods for choosing such a distribution and calculate the equivalent confidence level under each method and under different assumptions. We will illustrate each method using a case study, which is introduced in the next section.

2. Case study

To demonstrate the impact different translation methods can have on the disclosed equivalent IFRS 17 risk adjustment confidence level, we consider an entity that calculates economic capital on a Solvency II standard formula basis and its own economic capital basis. The entity writes regular premium term assurances and has derived distributions for its lapse, mortality, and expense risk in its internal modeling. However, as it reports on a Solvency II Standard Formula basis, and already produces a risk margin, it has chosen the cost of capital approach⁴ to determine its IFRS 17 risk adjustment.

Under the cost of capital approach, the capital requirement for non-financial risk at a specific percentile, is projected for the lifetime of the business. The present value of these capital requirements is then calculated using an appropriate discount rate and a cost of capital is applied. In our example, the percentile of the capital requirements was 99.5th and the cost of capital used was 6%. The resulting IFRS 17 risk adjustment is calculated as 29.7 million.

3. Method 1 – Assumed distribution for PVCFs

Perhaps the simplest approach is to assume a parametric distribution (for example, normal, lognormal, or Students' T) for the change in PVCFs and calibrate its parameters to other available value or risk metrics. In this example, we consider distributions that are described by two parameters, and choose these parameters so that:

- » The median of the distribution is zero.
- » The 99.5th percentile of the distribution is 47.9 million, the Solvency II standard formula SCR for non-financial risk, which in this case is readily available as part of the entity's regulatory reporting.

Figure 1 shows the projected capital requirements for non-financial risk, the resulting risk adjustments calculated under the cost of capital method, and their mapping to an equivalent confidence level.

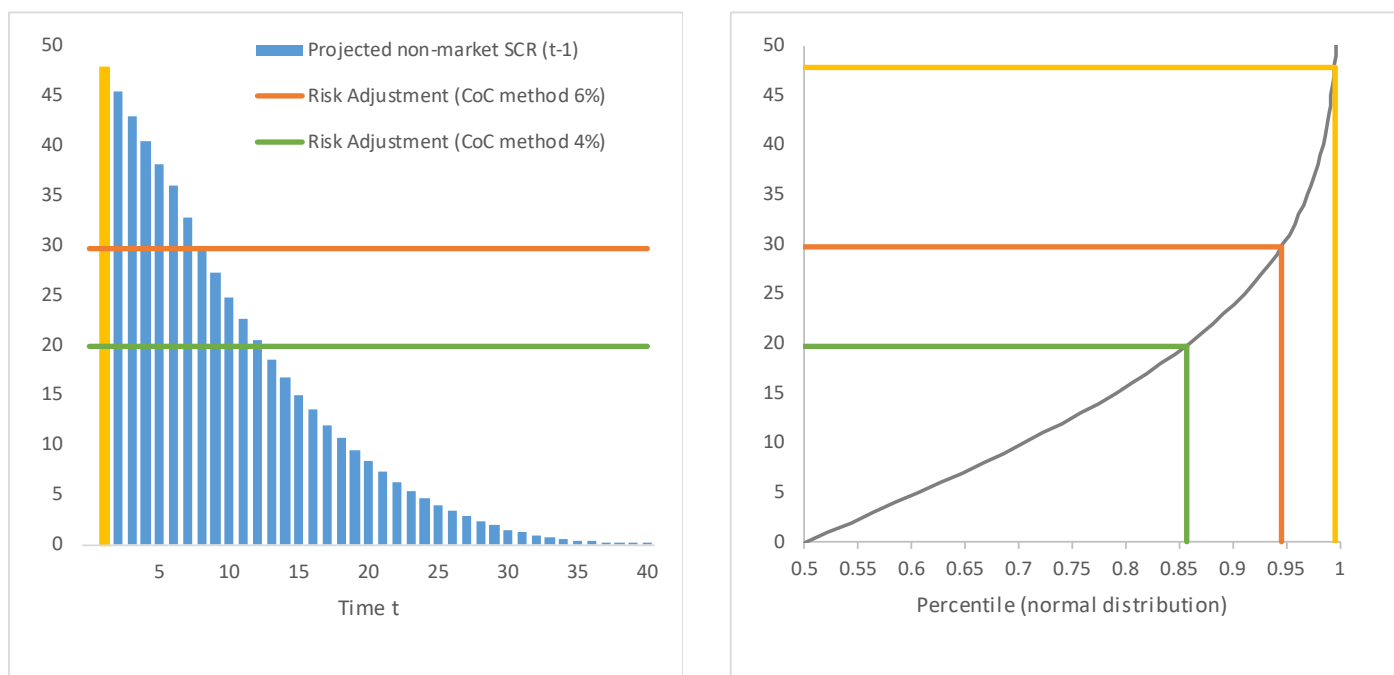
1 IFRS 17 Insurance Contracts – Appendix A Defined Terms

2 Potential calculation methodologies are discussed in more detail in the Moody's Analytics paper “Calculating the IFRS 17 risk adjustment” Hannibal, C. (2018)

3 IFRS 17 Insurance Contracts – Paragraph B119

4 The cost of capital approach and other potential calculation methodologies are discussed in more detail in the Moody's Analytics paper “Calculating the IFRS 17 risk adjustment” Hannibal, C. (2018)

Figure 1 – Mapping of risk adjustment to equivalent confidence level (normal distribution)



The bar chart on the left shows the projected non-market SCR, with the yellow bar highlighting the non-market SCR at t=0. The orange and green lines show the resultant risk adjustments, calculated by discounting these projected non-market SCRs and applying different costs of capital (6% in orange and 4% in green).

The chart on the right shows the percentiles of a normal distribution (gray line) calibrated so that it matches the assumed median (0) and 99.5th percentile (47.9 million).

Given this distribution, we can easily calculate the resulting equivalent confidence levels corresponding to risk adjustments calculated using different cost of capital assumptions. In this case, the equivalent confidence levels are calculated as 94.5% (assuming 6% cost of capital) and 85.7% (assuming 4% cost of capital).

Under the cost of capital technique, although the risk adjustment is calculated using projected capital requirements at a 99.5% confidence level, it does not mean that the equivalent confidence levels for the risk adjustment are equal to 99.5%. Under the cost of capital approach, the risk adjustment is calculated by projecting 99.5% capital requirements over the entire coverage period, discounting, summing, and multiplying by the chosen cost of capital. The resulting risk adjustments in this case are lower than the SCR for non-financial risk, and so the equivalent confidence levels are lower than 99.5%.

The advantage of this method is its simplicity. It is simpler to explain than some other methods so it is pertinent for disclosures. The method does not require any stochastic models or complex calculations. It is quick and simple to calculate so it is unlikely to delay a reporting process as long as the corresponding Solvency II (or other economic capital basis) inputs are available.

Conversely, this method makes some broad assumptions. In particular, it assumes the distribution of the best estimate liabilities (BEL) is an appropriate proxy for the distribution of the IFRS 17 PVCFs. Whether this assumption is appropriate depends largely on the consistency between the IFRS 17 cash flows and those assumed for Solvency II (or the economic capital basis used for the calibration). Elements to consider include contract boundaries, application of stresses, and the exclusion of financial risks.

This method is sensitive to the shape of the chosen distribution, as shown by the difference in result when alternative distributions are used in place of the normal distribution. To illustrate, Figure 2 shows the translation of the risk adjustment (assuming 6% cost of capital) to equivalent confidence levels using the Students' T distribution (with different degrees of freedom) in addition to a normal distribution. In all cases, the distributions are calibrated to match the same median and 99.5th percentile. Figure 3 shows the resulting equivalent confidence levels.

Figure 2 – Mapping of risk adjustment to equivalent confidence level (normal, t5, and t2 distributions for PVCFs)

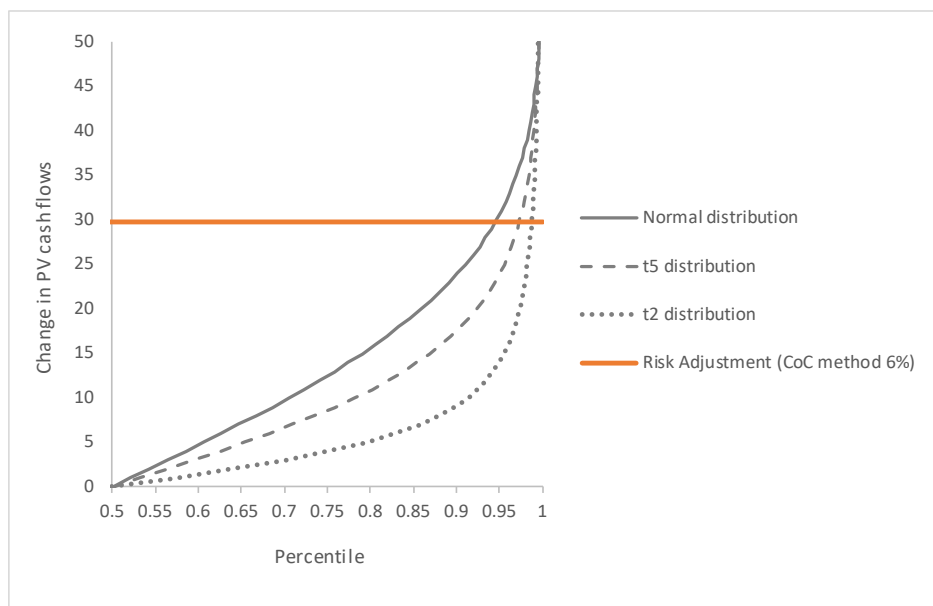


Figure 3 – Equivalent confidence level assuming different parametric distributions for change in PVCFs

Assumed distribution for PVCFs	Risk adjustment equivalent confidence level
Normal	94.5%
Students' T (5 degrees of freedom)	97.3%
Students' T (2 degrees of freedom)	98.7%

In this example, the equivalent confidence level varies between 94.5% and 98.7% depending on the assumed distribution, even though these have been calibrated to the same reference percentiles (median and 99.5th percentile). Furthermore, other choices are available, in particular:

- » A different assumed distribution. Our example shows the normal and Students' T distributions but other distributions might be deemed more appropriate.
- » A different reference percentile. This might naturally be the case where an internal economic capital basis is used instead of Solvency II that has been calibrated to a different percentile.

4. Method 2 – Assumed distribution for non-financial risk

Under this method, the distribution of the change in PVCFs is not assumed but generated using a model for the underlying non-financial risk factors. This method requires generating several thousand scenarios and recalculating the PVCFs under each one and so is better suited to companies that have scenario-based internal models and/or highly efficient cash flow models. Models that use techniques such as proxy modeling might also be a suitable alternative. However, even in these cases, the resource required might not be available within the required timelines.

For our case study, we have generated 100,000 scenarios assuming the different marginal distributions for each of the underlying non-financial risk factors (in this case mortality, lapse, and expense shocks). In all cases, 99.5th percentiles of the distributions are chosen to equal the corresponding Solvency II standard formula assumptions and a Gaussian copula dependency is assumed.

Figure 4 shows the resulting distributions for the PVCFs and translation of the risk adjustment (assuming 6% cost of capital), while Figure 5 shows the resulting equivalent confidence levels.

Figure 4 – Mapping of risk adjustment to equivalent confidence level (normal, t5, and t2 distributions for risk factors)

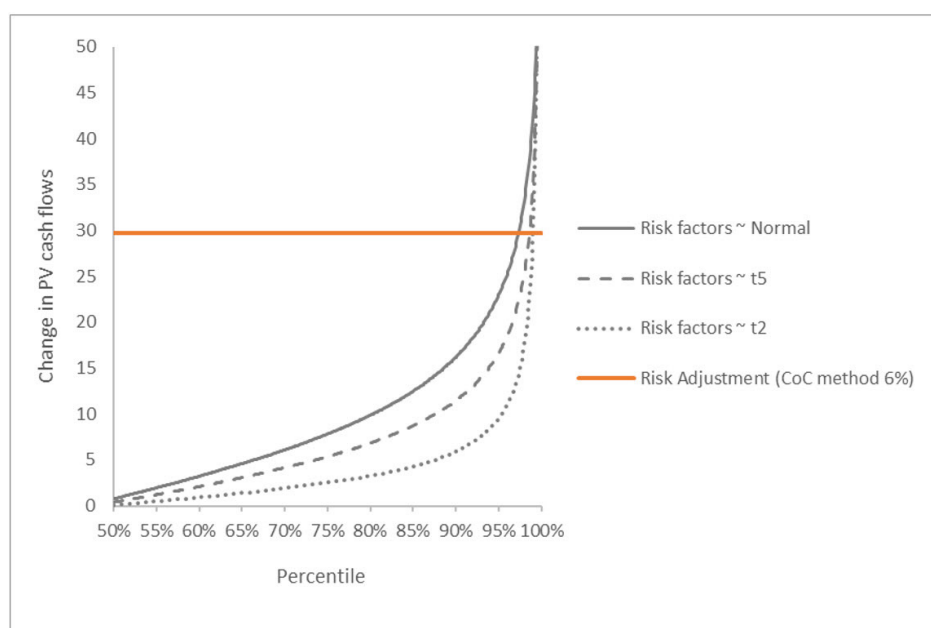


Figure 5 – Equivalent confidence level assuming different distributions for underlying risk factors

Assumed risk factor distribution	Risk adjustment equivalent confidence level
Normal	97.3%
Students' T (5 degrees of freedom)	98.6%
Students' T (2 degrees of freedom)	99.0%

This method gives a range of equivalent confidence levels depending on the assumed distribution of the underlying risk factors. Other choices are available; in this case, for the assumed copula and the marginal distributions for the risk factors.

5. Conclusions

One factor to consider when choosing a risk adjustment methodology is the requirement to disclose the equivalent confidence level. Entities without existing capital-based reporting regimes might prefer to use the VaR method directly to avoid subsequent calculations to translate the result. Entities wishing to use elements of their existing capital reporting process can use a VaR method or some other method. Where they use a method other than VaR, a translation methodology is also required.

The decision for the translation methodology depends on many factors, including:

- » Accuracy, complexity, and ease of communication. Some of the methodologies described in this paper are challenging to implement and difficult to explain. The complexity and accuracy of the IFRS 17 risk adjustment calculation must be considered as it would be inappropriate for the translation methodology to be more complex than the underlying IFRS 17 risk adjustment calculation methodology.
- » Availability of data, models, and modeling resources. The methodologies described in this paper rely on outputs from and/or models used for other reporting processes. These might or might not be available within the IFRS 17 reporting timeline.
- » Stability of results. The purpose of equivalent confidence level is to facilitate comparisons, both over time and between different entities, so the translation methodology itself should not be volatile and should not change frequently. For example, a methodology that relies on output or models that are not available at every reporting cycle would not be appropriate.

This paper shows that after calculating a single value for the IFRS 17 risk adjustment, several different equivalent percentiles can be derived depending on the translation methodology used. In our examples alone, the equivalent percentile could be anything between 94.5% and 99.0%. Choosing an appropriate methodology for the translation can have as much of an impact as choosing the methodology for the IFRS 17 risk adjustment calculation itself.

6. References

IASB, May 2017, IFRS 17 Insurance contracts

<https://www.ifrs.org/issued-standards/list-of-standards/ifrs-17-insurance-contracts/>

Moody's Analytics articles:

Hannibal, C, August 2018, Introduction to IFRS 17 Risk Adjustment

<https://www.moodyanalytics.com/articles/2018/calculating-the-ifrs17-risk-adjustment>

© 2019 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be reckless and inappropriate for retail investors to use MOODY'S credit ratings or publications when making an investment decision. If in doubt you should contact your financial or other professional adviser.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for appraisal and rating services rendered by it fees ranging from JPY200,000 to approximately JPY350,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.