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Effect of Credit Deterioration on Regulatory Capital Risk Weights for Structured Finance Securities

VIVEK THADANI AND PETER SALLERSON

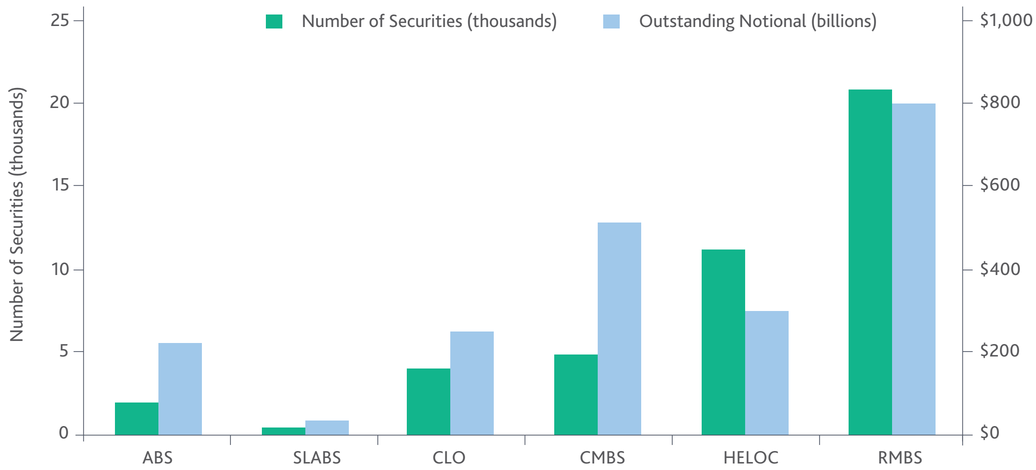
With regulatory stress testing becoming more entrenched in general risk management, the need to understand the credit-specific drivers of regulatory risk weights has become an important function of risk management. This article aims to illustrate the general impact of credit deterioration on regulatory capital risk weights in a large dataset of multiple structured finance asset classes. For investors and risk managers, any asset class-specific trends can help in the investment evaluation process.

Criteria for the analysis portfolio

To understand the actual impact of credit deterioration on regulatory capital risk weights across the universe of structured finance securities, we chose a large cohort of comparable securities that would broadly illustrate trends and effectively represent the universe as a whole, based on the following:

1. The current outstanding notional amount as of September 30, 2014 was at least US $1 million.
2. We excluded interest-only or combination tranches, which would have made the portfolio less uniform across asset classes. Excluding these tranches also removed the effect of cross-tranche referencing, a feature of combination tranches.
3. To study the effect of credit deterioration on regulatory capital, we excluded resecuritizations that would have required using a higher Simple Supervisory Formula Approach (SSFA) supervisory calibration,[1] so that we could observe the effect of credit deterioration in isolation. Further details on the supervisory calibration parameter and its impact on the SSFA formula can be found in the Appendix.
4. For student loan securities, we excluded the Federal Family Education Loan Program (FFELP) government-guaranteed transactions because the impact of credit deterioration on these

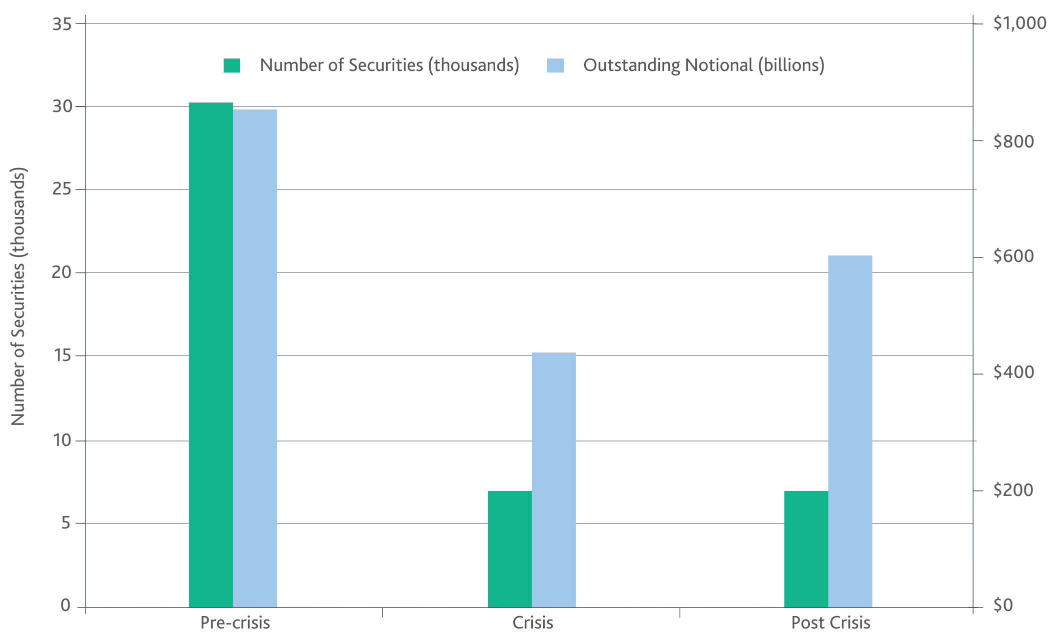
Figure 1 Analysis portfolio by asset class



Source: Moody's Analytics

One key observation is that the stresses do not affect all asset classes similarly; some can withstand such shocks across the rated structure better than others. This observation is in line with what we expected – that CLO and ABS securities have, on average, better credit protection.

Figure 2 Analysis portfolio by vintage ranges



Source: Moody's Analytics

securities can be affected by policy decisions. This would have introduced another dimension that was out of the scope of this analysis.

5. We included only USD-denominated securities because credit quality can vary significantly between the USD-denominated securities in an asset class and similar non-USD-denominated securities.

The final portfolio for analysis comprised approximately 43,700 securities, which effectively represent the structured finance universe of non-agency transactions.[2]

As we expected, RMBS made up the largest segment analyzed (by number of securities and outstanding notional amount), owing to the large size of the non-agency RMBS market. Student loan ABS (SLABS) made up the smallest segment.

By vintage range, the portfolio reflects broad trends in issuance, with the large majority of securities having been originated before the crisis. For this analysis, "pre-crisis" covers securities originated in 2006 and earlier; "crisis" covers 2007-09; and "post-crisis" covers 2009 to the present. The large outstanding notional for a smaller number of securities in the post-crisis bucket is due to the high bond factors (low seasoning) as compared to pre-crisis.

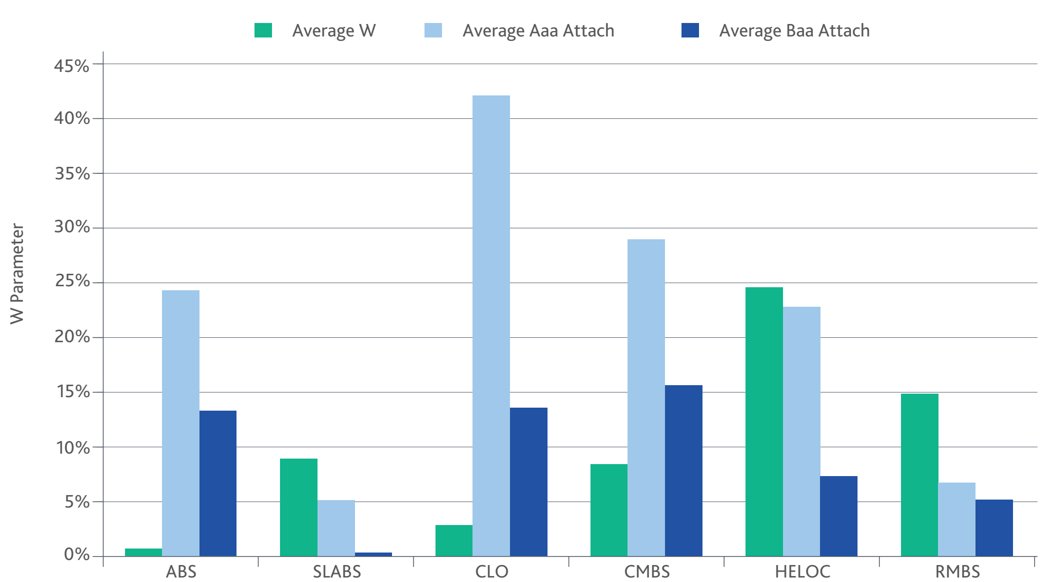
Current W parameter levels

For the SSFA for regulatory capital, the W parameter represents the current delinquency and non-performing levels in a pool. As defined in the Federal Register,[3] the W parameter comprises loans that are:

1. 90 days or more past due
2. Subject to bankruptcy or insolvency proceeding
3. In the process of foreclosure
4. Held as real estate owned (REO)
5. Have contractually deferred payments for 90 days or more, other than principal or interest payments deferred on:
   - Federally guaranteed student loans, in accordance with the terms of those guarantee programs
     -Or-
   - Consumer loans, including non-federally guaranteed student loans, pursuant to certain conditions
6. Are in default

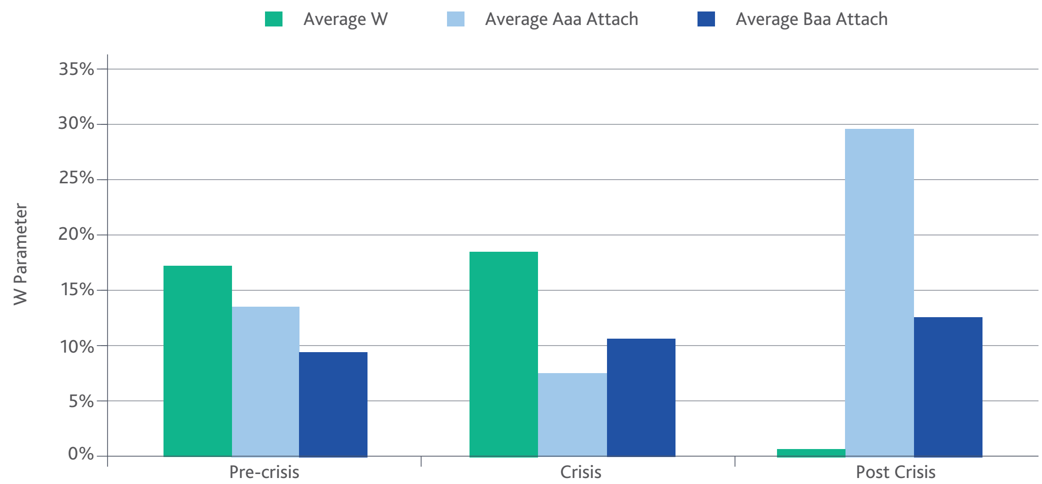
The SSFA formula requires normalization of a deal's structure to its attachment and detachment points, as well as normalization of the credit risk profile to its W parameter. Hence, for two

Figure 3 Average W levels and average Aaa and Baa attachment points by asset class



Source: Moody's Analytics

Figure 4 Average W levels and average Aaa and Baa attachment points by vintage range



Source: Moody's Analytics

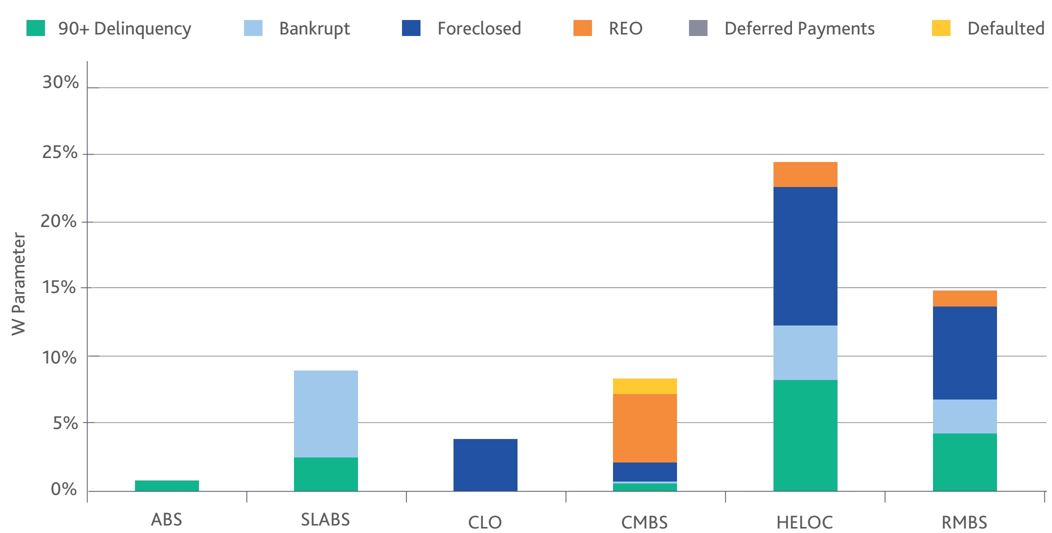
identically structured deals – i.e., two deals with similar attachment and detachment points – the current non-performing level represented by the W parameter is the primary driver of regulatory risk weight.

The risk weight is divided by 1250% to convert it to a regulatory capital charge. For this analysis, we use the risk weight as the parameter to analyze shocks to W. We used the risk weight instead of the capital charge because the risk weight is the more common benchmark in general risk management.

Credit deterioration stresses to the W parameter

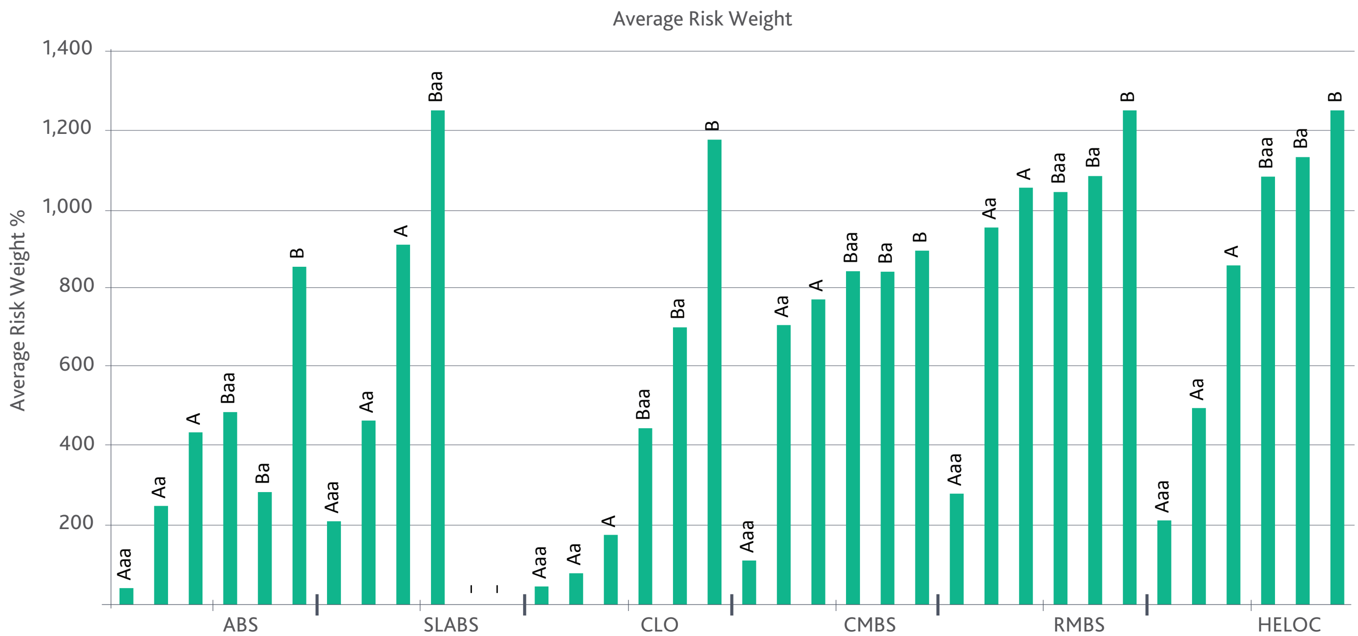
We stressed W instead of individual macroeconomic variables to exclude the dynamics of the different components of W

Figure 5 W parameter components by asset class



Source: Moody's Analytics

Figure 6 Average risk weight levels by asset class and original ratings



Source: Moody's Analytics

to macroeconomic stresses, which allows for a comparable evaluation of the regulatory impact on an entire asset class, as opposed to deal-specific credit performance. For example, if we stressed only one macroeconomic variable, such as home prices, we would expect a sharp increase in the W parameter for an RMBS and HELOC security, but little change to a CLO security. There could be indirect effects to the macro-variable that drive corporate leveraged loan performance, but these effects would be minimal and likely delayed. Furthermore, such a macroeconomic shock would not affect all RMBS deals uniformly, because underlying credit quality differs. Stressing W directly illustrates the overall regulatory performance of an asset class.

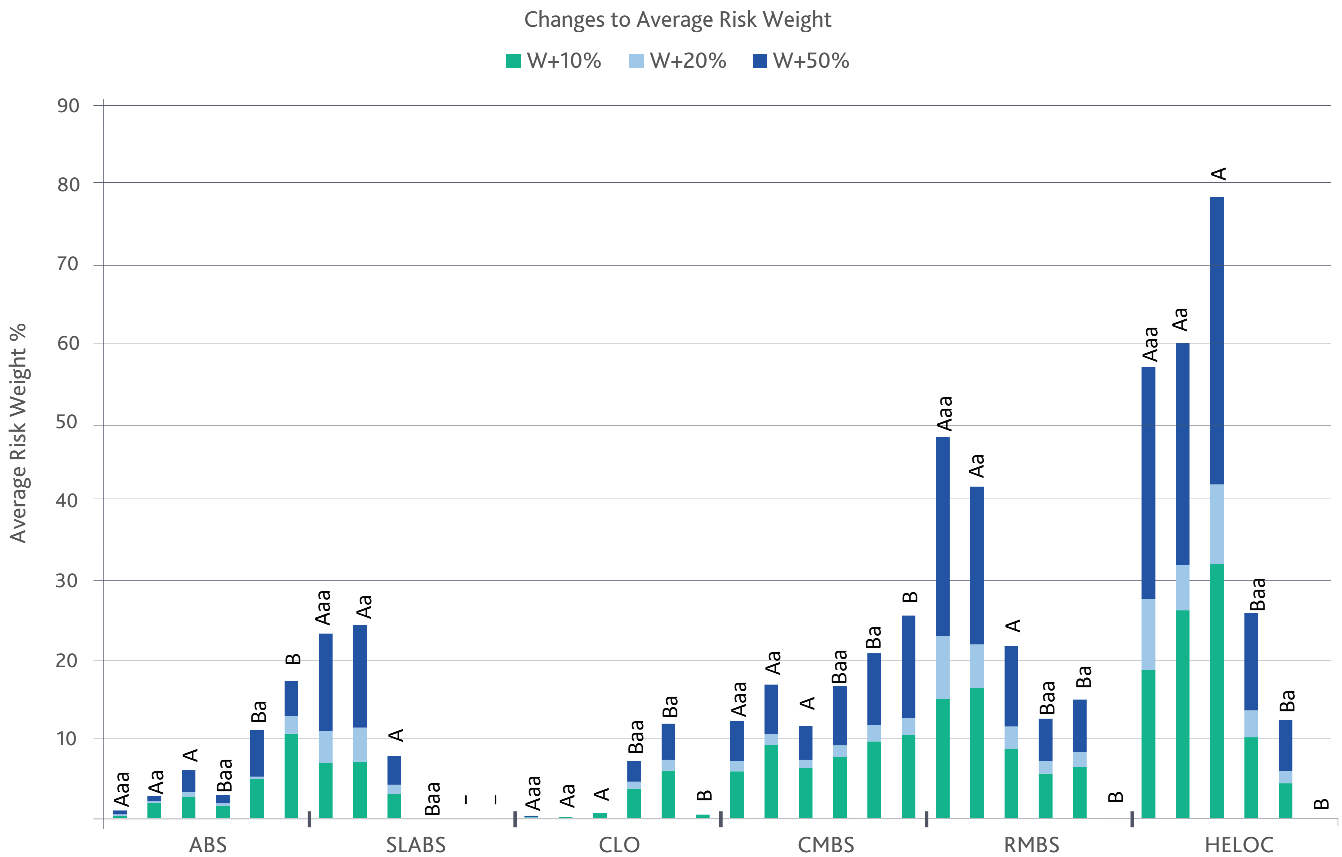
For the analysis, we used average levels instead of medians. Although the median could be considered a good indicator of trends, the average better illustrates the broad trends of the stressed risk weights. Given that credit deterioration does not necessarily affect all securities similarly, using a median would not demonstrate the true effect of the shock. The effects of a stress on credit quality can differ, such that the median value will remain unchanged but the risk weights of many securities will rise significantly. By using an average, the value will move in accordance with the segment overall and better demonstrate trends.

Figure 3 depicts the current average W levels for the entire analysis portfolio, along with the average attachment levels for Aaa- and Baa-rated securities. At a high level, it indicates current performance and credit enhancement for the asset classes. Specifically, the current average W level helps identify an expectation for credit deterioration shocks: changes to risk weight in the poorer performing asset classes should be greater than in the better performing asset classes.

Given that the SSFA formula assumes a fixed severity for the W bucket (see the Appendix), an alternate way to use the data is to gauge a security's ability to withstand credit shocks by how much higher a security attaches (average Aaa attachment and average Baa attachment) than by the average W bucket size (average W).

Such a back-of-the-envelope approach allows us to quickly determine that ABS and CLO are the only asset classes that have good credit protection at both the Aaa and Baa levels (Figure 3). These levels of credit protection are a function of how the transactions are structured and how their credit enhancement

Figure 7 Changes to average risk weight levels owing to credit deterioration shocks



Source: Moody's Analytics

changes over time. Conversely, we can expect current HELOC and RMBS performance to be fairly poor because the average W levels are higher than the average Aaa attachment levels.

Similarly, the current credit performance of a vintage segment shows good credit protection levels for post-crisis securities, as compared to crisis and pre-crisis securities.

When reviewing the performance of an asset class as defined by the W parameter, breaking down the components of the level is also helpful. In Figure 5, the various components highlight the different makeup of the average W levels. This dispersion is the primary reason for the decision to shock credit quality uniformly rather than by independent macroeconomic variables.

To gauge potential credit deterioration, we analyzed the average risk weight by segmenting the portfolio by asset class and the original Moody's Investor Service rating levels, which ranged from Aaa to B. We did not consider sub-ratings (1 to 3).

Figure 6 shows the average current risk weight by the segments used in the credit shock.

As expected, the SSFA-based risk weights are on average higher for lower rating levels. For SLABS, there were no securities originally rated Ba or B that met the selection criteria. Also, for the ABS buckets, very few securities were originally rated Ba and B and the average level skews to a low and high value. This would not be the case for one transaction – the B security will always have a higher risk weight compared to the Ba security in the same deal.

For this analysis, we ran three credit deterioration scenarios using values of 10%, 20%, and 50% to shock the current W level. For example, if a transaction had a current W level of 5%, we used values of 5.5%, 6%, and 7.5% for the three credit deterioration scenarios. Using a proportional approach ensures that the stress affects deals progressively – i.e., better performing deals are shocked by smaller stresses while worse performing deals are affected by larger stresses. Figure 7 shows the results for the credit quality shocks.

Although the effects of the credit deterioration stresses may appear to be minimal at the current W levels, we note some interesting trends. **One key observation is that the stresses do not affect all asset classes similarly; some can withstand such shocks across the rated structure better than others.** This observation is in line with what we expected – that CLO and ABS securities have, on average, better credit protection. The changes to risk weight owing to credit quality shocks, therefore, are minimal. Also, the performance of these securities in the scenarios aligns well with actual performance during the crisis.

The absolute change in stressed risk weight for the poorer performing asset classes (such as HELOC and RMBS) are higher than the stress applied. Although this view compares the relative change in W to the absolute change in risk weight – a relationship that is not linear – it helps to put the risk weight changes into context. While the change in risk weights is higher for the poorer performing asset classes, within an asset class such as RMBS or HELOC, the change in risk weight is low for lower rated securities. This is not surprising given that the lower rated securities are closer to the risk weight ceiling of 1250%.

Conclusion

There are a few different ways to interpret this analysis. From a regulatory perspective, the overarching theme is that credit deterioration affects different asset classes differently. This could be due to either the historical credit performance or the typical structure for an asset class or both. While risk management professionals can use different segmentations to analyze regulatory impact of portfolio changes, this analysis highlights high-level trends that should be considered at every step of the investment process.

Appendix – SSFA Mechanics[4]

The Simplified Supervisory Formula Approach requires a simpler calculation and data collection process. The trade-off for this is conservative assumptions on the losses of the underlying exposures, which could result in potentially higher regulatory capital requirements. The SSFA calculation requires the following input parameters:

1. Kg, which is the weighted average total base capital requirements of the underlying exposures
2. Parameter W, which is the ratio of the sum of underlying exposures that are seriously delinquent or defaulted for regulatory purposes[4]
3. Parameter A, which is the attachment point of the security
4. Parameter D, which is the detachment point of the security
5. Supervisory calibration parameter p, which is set to 0.5 for securitization exposures and 1.5 for resecuritization exposures (For this analysis, resecuritizations were excluded and the p was set to 0.5 for the entire portfolio.)

SSFA risk-based capital calculation:

$$\text{Risk Weight} = \left[\left(\frac{K_A - A}{D - A}\right) \times 1250\%\right] + \left[\left(\frac{D - K_A}{D - A}\right) \times 1250\% \times K_{SSFA}\right]$$

1	$K_A=(1-w).K_G+(0.5 \times w)$
2	$a = -\frac{1}{p \times K_A}$
3	$u=D-K_A$
4	$l=\max(A-K_A,0)$
5	$K_{SSFA} = \frac{e^{a.u} - e^{a.l}}{a(u-l)}$

1 Although we excluded multi-tranche resecuritizations that would have required using a higher SSFA supervisory calibration parameter of p=1.5, we did include all single-tranche re-remics with p=0.5.

2 We analyzed the portfolio using the Regulatory Module in the Moody's Analytics Structured Finance Portal.

3 See Federal Register, Vol. 78, No. 198, October 11, 2013..

4 For more information, see Federal Register, Vol. 78, No. 198, October 11, 2013.

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