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NEW YORK INDEPENDENT SYSTEM OPERATOR

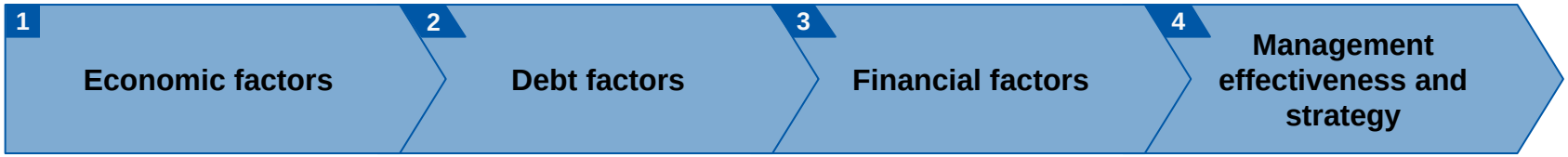
Financial Services

NYISO Credit Risk Enhancement
Credit Scoring Assessment

Credit Policy Task Force
March 27, 2009

Ratings are intended to provide a forward-looking opinion on a company's ability to meet its debt obligations

- The methodology for determining a rating varies by industry and by agency, but is generally a combination of the following factors



- Gage of economic sector and industry strength to set expectations for future performance
- Debt repayment or payout
- Debt structure
- Various debt ratios
- Measures of economic size
- Financial performance
- Ability of management to seize economic opportunities
- Quality of financial practices and risk management

- Prediction of credit risk is an art and not a science
  - No one ratio, or even a set of ratios will lead an agency to a specific ratings conclusion
  - Agencies seek to identify and understand an individual organization's strengths and weaknesses, and this understanding provides a basis for predicting the company's sensitivity to changes in its operating environment or financial condition that could lead to a greater probability of default
- Agency ratings indicate relative risks, not absolute risks
  - A firm rated AA is less likely to default than one rated B, but there is no indication of absolute risk or probability of default
  - However, past default rates can be used as guides, with the understanding that future rates may not equal past rates of default for a given credit rating

Source: S&P, Moody's

Rating Agencies struggle to balance the need for ratings stability with investors' desires for real-time indicators of default probability

- It is well known that agencies achieve ratings stability by employing a "through-the-cycle" methodology
  - This requires a separation of permanent and cyclical components of default risk
  - Agencies, ex ante, view creditworthiness as an intrinsic feature of an issuer that generally takes time to change
  - Consequently, Agency ratings are not designed to estimate short-term default risk

Benefits of through-the-cycle methodology

- Investors can keep their portfolio rebalancing as minimal as possible
- Ratings volatility can contribute to procyclicality effects – quick responses to credit ratings declines can accelerate financial crises
- Stability enhances the reputation of agencies, as agency reversals within a short period of time adversely impact an agency's reputation
  - Agencies take the approach that it is better to be late and right than fast and wrong

Drawbacks of through-the-cycle methodology

- Investors are not satisfied with timeliness of ratings
- Through-the-cycle ratings are more indicative of long-term default probabilities at the expense of short-term accuracy
- Information content of ratings changes is limited - to maintain stability, downgrades only reflect a portion of the relative risk level change calculated in agency reviews

Source: Gunter Loffler, "An Anatomy of Rating Through the Cycle", University of Frankfurt, 2002
Source: Edward Altman, "The effects of rating through the cycle on rating stability, rating timeliness and default prediction performance", Stern School of Business, 2005

NYISO's credit evaluation informational needs differ in important respects from that provided by the rating agencies

	NYISO's credit evaluation informational needs	Rating agency information
Probability of default information	Absolute probability of default information to calculate collateralization of obligations	Provides relative credit rating information
	Incorporation of systemic risk into creditworthiness evaluation	Demonstrated inability to forecast systemic risk
Timing	Short term accuracy of ratings (60-100 days)	Uses through-the-cycle methodology, for a long-term view of default risk
	Early warning information	Slow to downgrade to avoid procyclical effects and erosion of reputation
	Indication of default probability over defined time horizon	Indicates risk over multiple horizons, rather than a single, defined horizon
Trust	Trust amongst MPs of ratings methodology credibility	Investigations have revealed material weaknesses in agency methodologies

Due to limitations in the ability of agency ratings to fulfill NYISO's creditworthiness monitoring needs, NYISO should enhance its in-house credit risk management capabilities

We have developed new scorecards to assess Market Participant credit risk that address these shortcomings of agency ratings

Scorecard development methodology

Assemble company sample and factor list

- Generate large sample of companies, both performing and defaulted
- Factors include financial ratios and market based indicators

Calculate risk for each bucket

- Determine risk of default for a given factor value

Determine predictive power of each factor

- Calculate statistics on each factor which measure strength of predictivity

Select factors and weighting for scorecard

- Select assortment of factors and weights based on predictive power and expert opinion
- Determine final scorecard

Calculation of a Market Participant's score

Calculate risk score from each factor

- Calculate score by inputting factor values as of a particular date (market-based and financial factors)

Calculate Scorecard output

- Combine risk scores from each factor to get overall scorecard output

Determine credit adjustment

- Using scorecard output, determine credit adjustment (see slide #8)

Guidelines for applying public or private sector scorecard

Priority

	Primary criteria	Secondary criteria	Scorecard Category	Data source
1	Standalone public trading company	N/A	Public	MP's financials and market indicators
2	Subsidiary of a public company with its parent company as the guarantor	N/A	Public	Parent company's financials and market indicators
3	Subsidiary of a public company	With assets greater than $10BN USD assets	Public	MP's financials with parent company's market indicators
4	Subsidiary of a public company	That contributes 50% or more of its parent company's revenues or accounts for >50% of its assets	Public	MP's financials with parent company's market indicators
5	Subsidiary of a public company	That contribute less than 50% of its parent company's revenues or represents <50% of its assets	Private	MP's financials
6	Does not satisfy the criteria listed above		Private	MP's financials

NYISO's current MP portfolio

	Public	Private	Municipality/Government/ School (Private)
Number	33	12	18
% of Total MPs	52.4%	19.0%	28.6%

While overlapping, the indicators included in the scorecard for publicly owned MPs differ from those used in the private sector tool

Proposed methodology
Public MPs

Quantitative: 85% weight

Category	Weight
Market Indicators	
Absolute CDS spread	21.3%
Relative stock decline from 3 mo. high	4.3%
Stock return volatility (3 mo. stdev)	12.7%
Performance	
Revenue/mkt cap	12.7%
Retained earnings/ assets	8.5%
Debt Coverage	
Total debt/EBITDA	12.7%
Leverage	
Debt/(total debt + equity)	8.5%
Liquidity	
Cash/assets	4.3%

▼

Qualitative Considerations: 15%

▼

Final Credit Score

Proposed methodology
Private MPs

Quantitative: 70% weight

Category	Weight
Performance	
ROA	17.5%
Profit margin	10.5%
Debt Coverage	
Total debt/EBITDA	17.5%
Leverage	
Total debt/ total assets	17.5%
Liquidity	
Cash/assets	7.0%

▼

Qualitative Considerations: 30%

▼

Final Credit Score

Additional factors evaluated:

- **Public Entities**
  - Relative CDS increase from 3 month low
  - Quick Ratio
  - Cash Ratio
  - Current Ratio
  - Working Capital/Total Assets
  - Operating Margin
  - Profit Margin
  - ROA (Return on Assets)
  - ROE (Return on Equity)
  - Revenue/Assets
  - EBIT/Assets
  - EBITDA/Current Assets
  - Short Term Debt/Total Debt
  - Interest Coverage
  - Total Debt/Capitalization
  - Total Debt
  - Total Debt/EBIT
  - Total Debt/Total Assets
  - Total Liabilities/Total Assets
  - Revenue
  - Total Assets
  - Total Equity

- **Private Entities**
  - Quick Ratio
  - Cash Ratio
  - Current Ratio
  - Working Capital/Total Assets
  - Operating Margin
  - Revenue/Assets
  - EBIT/Assets
  - EBITDA/Current Assets
  - Short Term Debt/Total Debt
  - Interest Coverage
  - Total Debt
  - Total Debt/EBIT
  - Total Liabilities/Total Assets
  - Revenue
  - Total Assets

The factors on the previous slide were considered for, but not used in, the final scoring tool as they were not deemed as predictive as those factors ultimately used

- All factors were evaluated for their level of predictivity on both a standalone and joint basis

- The standalone evaluation considers the relationship between the risk factor value and company default, including:
  - Consistency of relationship across the full range of factor values
  - Power of risk factor to discern good credits from bad

- The joint evaluation considers how the risk factor enhances predictivity on a contributory basis:
  - Risk factors which may have performed well on a standalone basis may prove to contribute little predictive power when combined with others
  - Risk factors were combined in the final scorecard through iteration and expert judgement

- The final scorecard is then composed of the factors which in combination demonstrate the most predictiveness in our testing

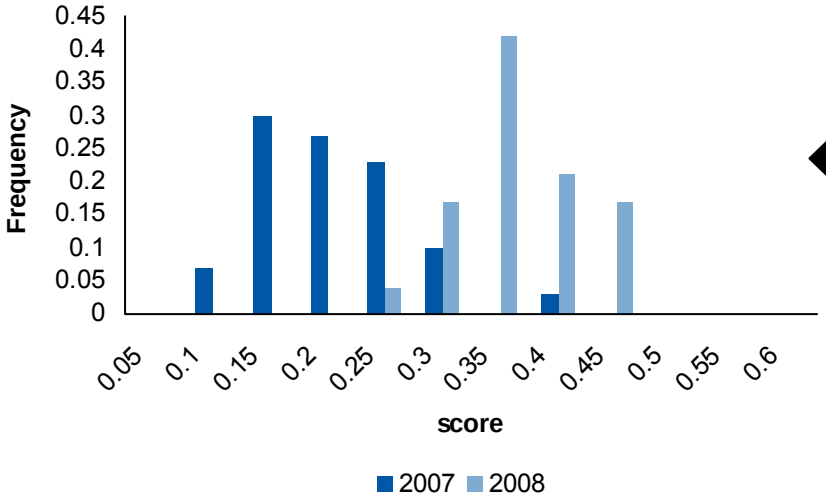
- The final scorecard includes financial risk factors from each of the key categories of financial indicators: Cash flow / Liquidity, Profitability, Leverage, and Size

MP score statistics for 2007 to 2008

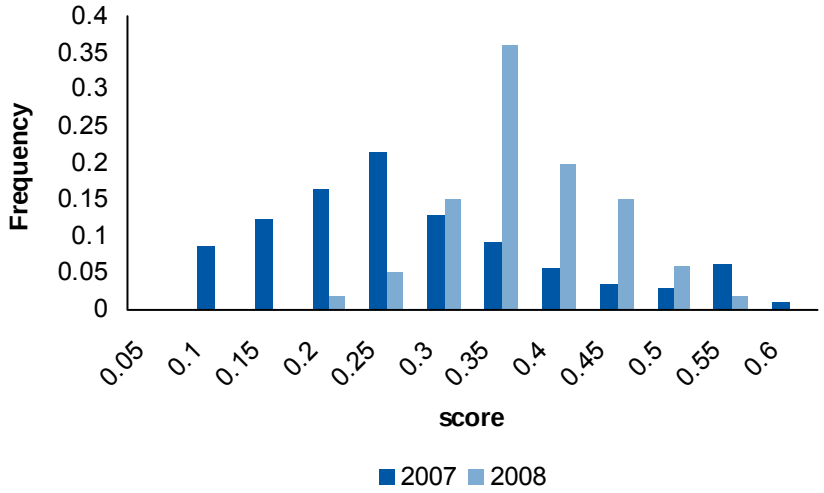
Comparison of average score of MP versus industry sample

Year	Public	Public Industry Benchmark Sample	Private	Private Industry Benchmark Sample
2007	0.19	0.30	0.32	0.30
2008	0.35	0.40	N/A	

Public MP score distribution



Public Industry score distribution



Observations

- Larger score movements from the optimistic environment in 2007 to the adverse situation in 2008 as compared to Moody's and S&P's

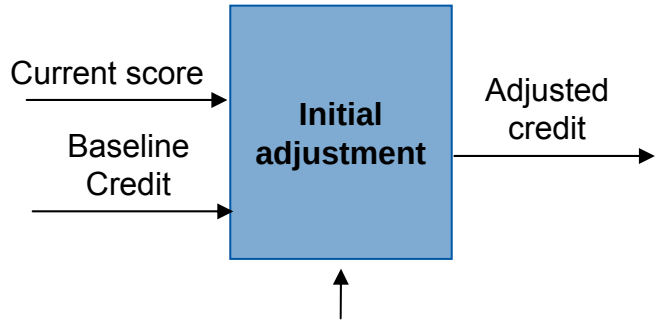
Comments

- Our risk indicator mapping exhibits better sensitivity to the changes in market environments

Unsecured credit adjustment process

Initial adjustment

- Adjustment made to baseline credit derived from TNW-credit matrix analysis



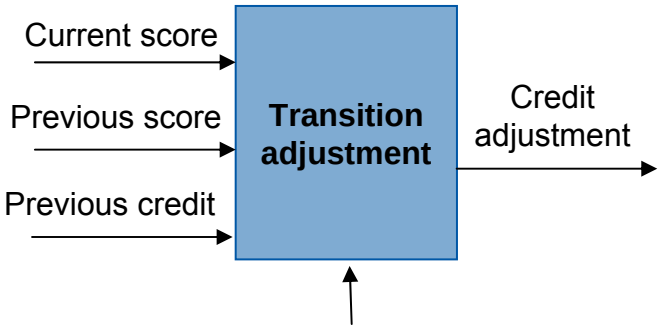
- Snapshot table used for credit adjustment

Score bucket	Public score range	Private score range	Adj
1	0.00 – 0.33	0.00 – 0.31	0%
2	0.33+ – 0.40	0.31+ – 0.39	-20%
3	0.40+ – 0.45	0.39+ – 0.43	-50%
4	0.45+ – 0.50	0.43+ – 0.48	-80%
5	0.50+	0.48+	-100%

- Initial adjustment is made after any change to the TNW-credit analysis (i.e. a change in rating)

Transition adjustment

- NYISO may choose to update the scorecard score at any point, resulting in a further adjustment to credit



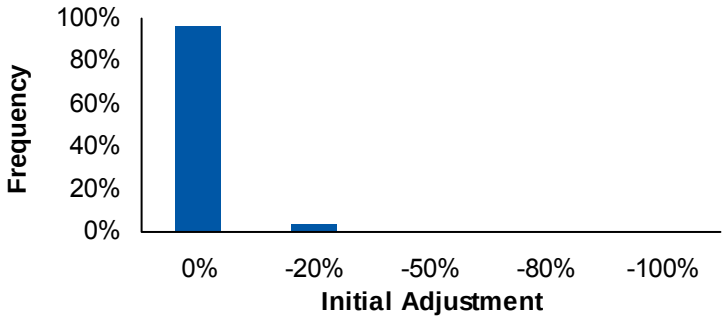
- Table used for credit update

		Current score bucket				
		1	**2**	**3**	**4**	**5**
Previous score bucket	**1**	0%	-20%	-50%	-80%	-100%
	2	25%	0%	-38%	-75%	-100%
	3	100%	60%	0%	-60%	-100%
	4	400%	300%	150%	0%	-100%
	5	NA	NA	NA	NA	NA

Summary of credit adjustment based on the proposed methodology

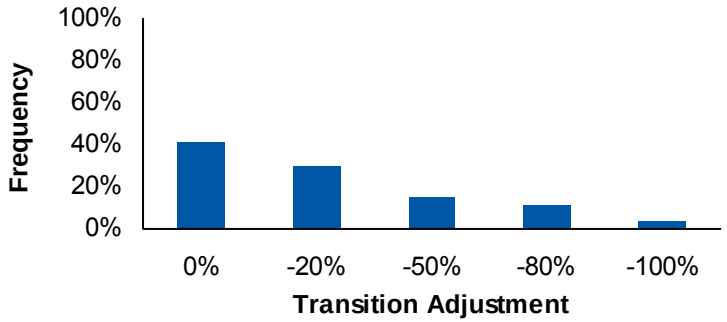
Public MPs – Initial adjustments

Q1 2008



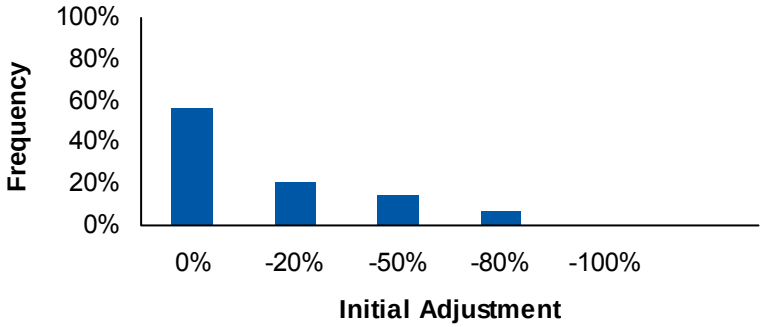
Public MPs – Transition adjustments

Q1 2009



Private MP's – Initial adjustments

Q1 2008



Comments

- The transition adjustment reflects the overall credit deterioration of MPs over 2008. Examining the historical data of non-performing MPs such as Lehman Brothers and several others, the scorecard would have led to an elimination of or severe reduction in unsecured credit.
- While an elimination of or reduction in unsecured credit may have occurred, some MPs may not have been affected depending upon their net position in the market and/or other forms of credit that may have been held.

▪An MP which is subject to a 100% reduction of credit will *not* be immediately eligible for a restoration of unsecured credit upon improving its credit score

▪To qualify for a restoration of unsecured credit, an MP must demonstrate two quarters of credit-qualifying performance (i.e. initial adjustment of >-100%)

Examples of unsecured credit adjustment scenarios

- **The following three slides provide examples illustrating the application of the proposed credit assessment tool. These examples are being provided for information only, and are not intended to be representative of actual Market Participant data or credit assessments.**

- General scenario setup:
  - Four illustrative credit events happened along the timeline ((A) → (D))
  - Either tangible net worth (TNW) or rating is updated at event (D)
  - The score movements and updates in the scenario are meant to be illustrative
  - The example scenario setup does not imply the frequency of score update

Scenario setup summary

Scenario	MP setup	Event summary
1	▪ Initial TNW = 2BN ▪ Initial Issuer Rating = A ▪ Concentration Cap = 250M	(A) Initial credit determination (B) Score deteriorates from bucket 2 to bucket 4 (C) Score improves from bucket 4 to bucket 3 (D) TNW updated to 1.6BN
2(a)*	▪ Initial TNW = 4BN ▪ Initial Issuer Rating = A ▪ Concentration Cap = 250M	(A) Initial credit determination (B) Score deteriorates from bucket 1 to bucket 2 (C) Score deteriorates further from bucket 2 to bucket 4 (D) Rating downgraded from A to A-
2(b)*	▪ Initial TNW = 10BN ▪ Initial Issuer Rating = A ▪ Concentration Cap = 250M ▪ Credit reaches concentration cap	(A) Initial credit determination (B) Score deteriorates from bucket 1 to bucket 2 (C) Score deteriorates further from bucket 2 to bucket 4 (D) Rating downgraded from A to A-

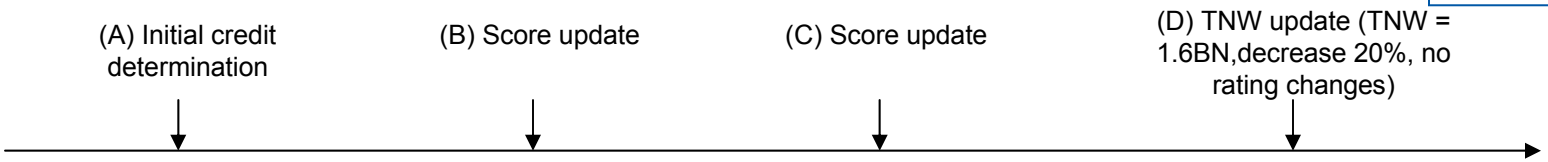
* Scenario 2(a) and 2(b) are the same setup except that the illustrative MP in 2(b) has a greater initial TNW so its credit is capped by the concentration cap

Example of unsecured credit adjustment – Scenario 1

Concentration Cap = 250M

TNW = 2BN

Issuer Rating = A



Illustrative

Factor	Value
%TNW	100M
Previous score bucket	NA
Current score bucket	2
Credit adj (ini)	-20%
Credit adj (trans)	NA
Previous Credit	NA
Final credit	100M* (1-20%) = 80M

Factor	Value
%TNW	100M
Previous score bucket	2
Current score bucket	4
Credit adj (ini)	NA
Credit adj (trans)	-75%
Previous Credit	80M
Final credit	80M* (1-75%) = 20M

Factor	Value
%TNW	100M
Previous score bucket	4
Current score bucket	3
Credit adj (ini)	NA
Credit adj (trans)	150%
Previous Credit	20M
Final credit	20M* (1+150%) = 50M

Factor	Value
%TNW	80M
Previous score bucket	NA
Current score bucket	3
Credit adj (ini)	-50%
Credit adj (trans)	NA
Previous Credit	NA
Final credit	80M* (1-50%) = 40M

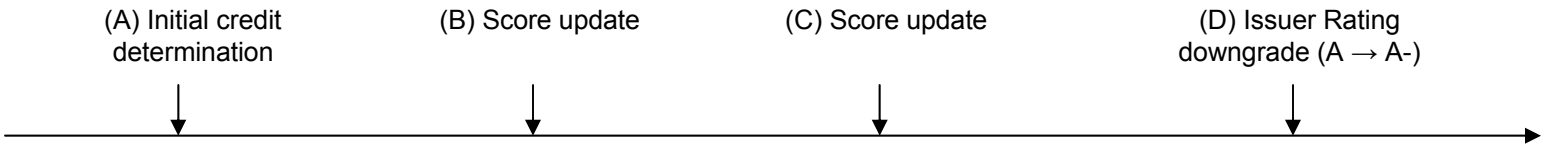
The MP in this scenario starts with a credit line of $100M from the TNW-credit matrix and its score is in bucket 2. As a result, the actual credit offered would be $80M based on the initial adjustment. During (B) and (C) only scores are updated and the credit adjustments are based on the current score and the previous score. At (D), TNW is updated with a 20% decrease. This event resets the MPs credit limit with a new initial adjustment by the current score bucket(3) and the new TNW representing a change in credit commensurate with decline in the tangible net worth.

Example of unsecured credit adjustment – Scenario 2(a)

Concentration Cap = 250M

TNW = 4BN

Issuer Rating = A



Illustrative

Factor	Value
%TNW	200M
Previous score bucket	NA
Current score bucket	1
Credit adj (ini)	0%
Credit adj (trans)	NA
Previous Credit	NA
Final credit	200M* (1+0%) = 200M

Factor	Value
%TNW	200M
Previous score bucket	1
Current score bucket	2
Credit adj (ini)	NA
Credit adj (trans)	-20%
Previous Credit	200M
Final credit	200M* (1-20%) = 160M

Factor	Value
%TNW	200M
Previous score bucket	2
Current score bucket	4
Credit adj (ini)	NA
Credit adj (trans)	-75%
Previous Credit	160M
Final credit	160M* (1-75%) = 40M

Factor	Value
%TNW	160M
Previous score bucket	NA
Current score bucket	4
Credit adj (ini)	-80%
Credit adj (trans)	NA
Previous Credit	NA
Final credit	160M* (1-80%) = 32M

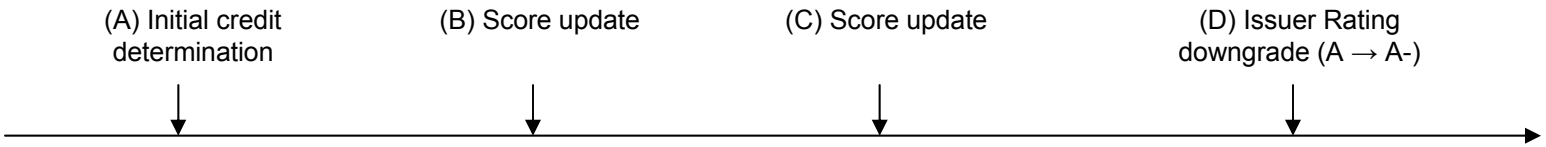
The MP in this scenario starts with a credit line of $200M based on the agency ratings (A) and TNW. At that moment its score is in bucket 1. As a result, no adjustment is applied. During (B) and (C) only scores are updated and the credit adjustments are based on the current score and the previous score. During both periods, the MP's score deteriorates. At (D), the rating is updated from A to A- and it corresponds to a starting point for determining unsecured credit of 4% of TNW. This event resets the MPs credit limit based on the new % of TNW and a new initial adjustment by the current score bucket(4).

Example of unsecured credit adjustment – Scenario 2(b)

Concentration Cap = 250M

TNW = 10BN

Issuer Rating = A



Illustrative

Factor	Value
%TNW	250M
Previous score bucket	NA
Current score bucket	1
Credit adj (ini)	0%
Credit adj (trans)	NA
Previous Credit	NA
Final credit	250M* (1+0%) = 250M

Factor	Value
%TNW	250M
Previous score bucket	1
Current score bucket	2
Credit adj (ini)	NA
Credit adj (trans)	-20%
Previous Credit	250M
Final credit	250M* (1-20%) = 200M

Factor	Value
%TNW	250M
Previous score bucket	2
Current score bucket	4
Credit adj (ini)	NA
Credit adj (trans)	-75%
Previous Credit	200M
Final credit	200M* (1-75%) = 50M

Factor	Value
%TNW	250M
Previous score bucket	NA
Current score bucket	4
Credit adj (ini)	-80%
Credit adj (trans)	NA
Previous Credit	NA
Final credit	250M* (1-80%) = 50M

The MP in this scenario starts with a credit line of $250M based on the agency ratings (A), TNW and concentration cap. At that moment its score is in bucket 1. As a result, no adjustment is applied. During (B) and (C) only scores are updated and the credit adjustments are based on the current score and the previous score. During both periods, the MP's score deteriorates. At (D), the rating is updated from A to A- and it corresponds to a starting point for determining unsecured credit of 4% of TNW. The unsecured credit is still capped by the concentration cap. This event resets the MPs credit limit based on the new % of TNW, the concentration cap and a new initial adjustment by the current score bucket(4).