

9th Webinar on Banking, Finance and Investments

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Modelling credit risk scenarios using stochastic techniques for asset managers

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2023 global corporate default and transition study

Overview of
global corporate
bond spreads

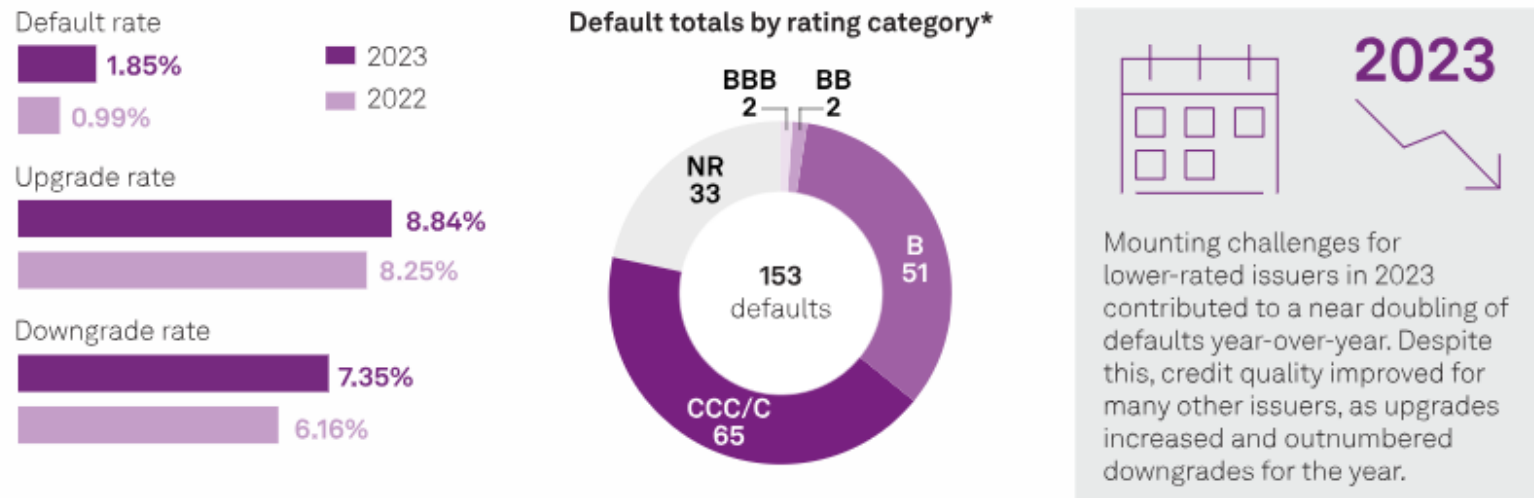
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2023 global corporate default and transition study snapshot



*Rating category shows rating one year prior to default. NR--Not rated. Source: S&P Global Ratings.
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The number of defaults nearly doubled in 2023, rising to 153 (from 85) as inflation and higher interest rates squeezed some issuers' cash flows. Furthermore, financing conditions were challenging for the lowest-rated borrowers and funding liquidity was tight. These conditions heightened the credit stress on the lowest-rated issuers, and the global speculative-grade ('BB+' or lower) default rate rose to 3.7% in 2023 from 1.9% in 2022

Source : [S&P Default, Transition, and Recovery: 2023 Annual Global Corporate Default And Rating Transition Study](#)

Corporate bond spreads: global economy



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Updates for major economies end of Sep 2024

- GBP: Corporate bond spreads have not changed significantly since May
- USD: As of August 2024, the 10-year HQM corporate bond rate was 4.8%, and the 5-year rate was 4.4%. The yield for Moody's Seasoned Baa corporate bonds was 6.1%
- EUR: In fixed income markets, corporate bond spreads, especially for high-yield bonds, have fallen, despite a decline in credit quality for high-yield non-financials, particularly in real estate
- CAD: Corporate credit spreads remained narrow, reflecting stable corporate performance and resilient equity markets
- AUD: Non-financial corporate spreads narrowed over recent months, supported by strong demand from domestic and offshore investors. Corporate bond issuance has been above average in Australia and has increased in the United States and Europe.
- JPY: Corporate bond yields have increased slightly, reflecting the rise in Japanese government bond (JGB) yields

Modelling risk using real world ESGs

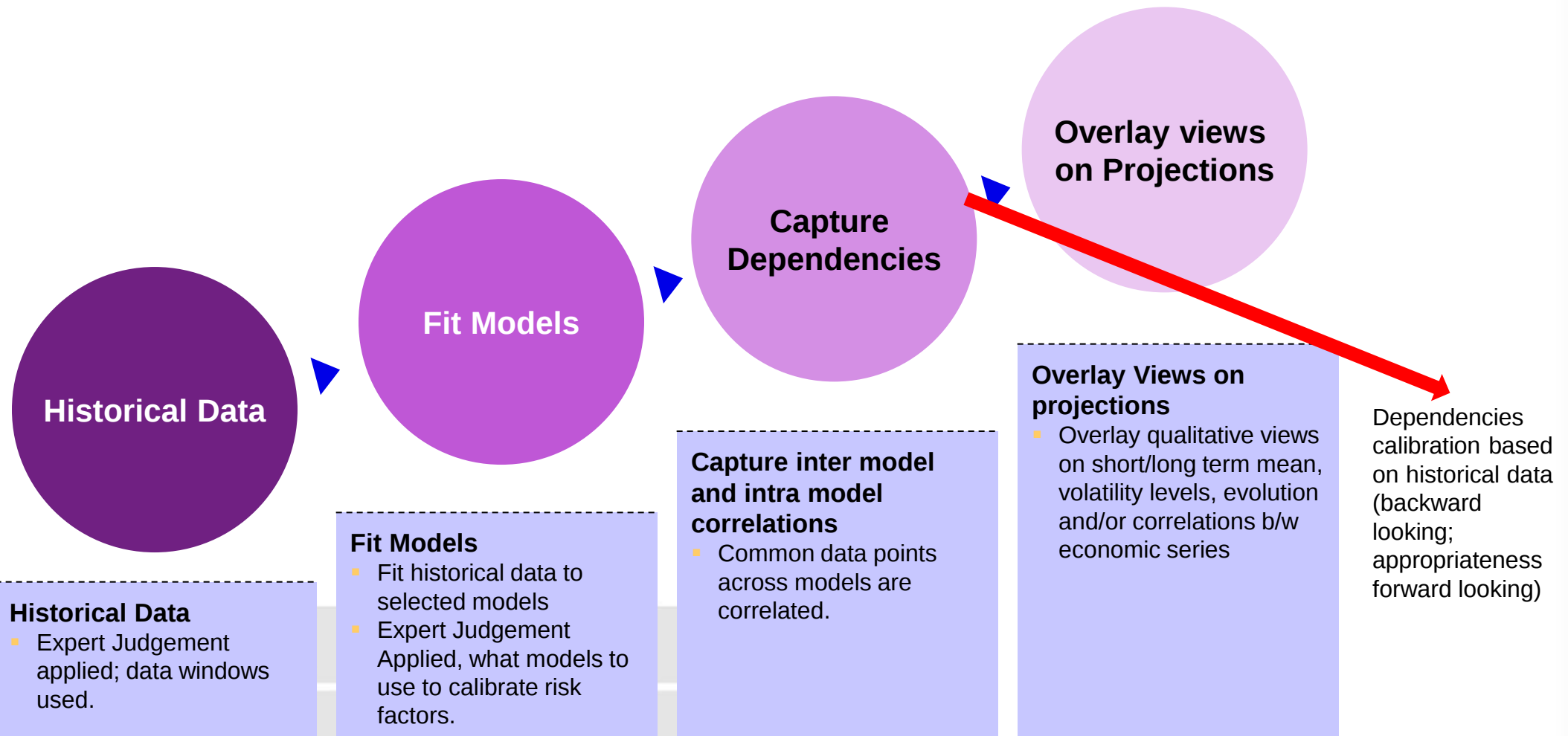
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Modelling risk using real world ESGs cont....

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- Imposing qualitative views allows us to capture market dynamics within projections for both short-term and long-term distribution
- Short term distribution will reflect current market volatility and uncertainty
- Allowing for sensible mean reversion speeds will reflect an economically consistent path for the modelled series from its current state to its normative state (long term stable state).

Target	Short-term (1 year)	Long-term (20 years)
Returns	Current conditions	History/current conditions
Volatilities	History/current conditions	Historical mean reversion
Correlations	History/theory	Model-implied
Distribution	History/theory	Model-implied

Key areas

Credit Modelling: requirements of a good model



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- Stochastic and positive credit spreads with granular rating and term structure, non-perfectly correlated movements and plausible distributions, including 0.5th and 99.5th percentiles.
- Stochastic credit transitions and defaults that are linked to credit spreads and give sensible expected returns.
- For each time step and scenario, the outputs are a transition matrix and a credit spread for each duration and rating
- Long term model dynamics not affected by recent market conditions
- Ability to control speed of mean reversion of credit spreads and real-world transition probabilities
- Ability to implement different sectors (financial and non-financial)
- Non-zero correlation with nominal interest rates
- Achieve a good curve fit for the latest market credit spreads
- Stability of projected spreads distribution in the long term

Complexity of credit modelling



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Spreads, excess returns and transition matrices

- In specifying assumptions for credit, there are three key levers: credit spreads, transition matrices and excess returns.
- When calibrating the model, the preference of spreads and excess returns over transition matrices can be due to:
 - Better data availability: Spreads and excess returns are available at any time (permitting the use of monthly or daily data), whereas transition matrices are only computed annually
 - Spread and excess return data is usually market-weighted, whereas transition matrix data is issuer-weighted
 - Transition matrices depend on handling of Not Rated entities, i.e. entities that have their rating withdrawn
 - Returns are usually the metric that matters most
- Calibration approach can lead to some discrepancy of model vs historical transition matrix. This can be due to several factors:
 - Not Rated entities: Not all bonds may have ratings, in reality ratings can be withdrawn. We expect the spread to go up for a firm who loses its credit rating (negative indicator, investor preference for rated bonds, firm falls out of benchmark indices). This gives a negative contribution to excess returns, which needs to be incorporated in the model.
 - Spreads and excess returns are market-weighted, whereas transition matrices are issuer-weighted. Bond defaults from IG are rare and hence a default of a smaller firm will have a material impact on default rates but not on spreads and excess returns. Average $\neq$ weighted average. Difference can be material for rating-term buckets with few firms and/or for events whose impact depends on firm size.
 - Differences between rating agencies

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Model defaults vs Historical events

Global corporate annual default rates by rating category (%)

	AAA	AA	A	BBB	BB	B	CCC/C
1981	0.00	0.00	0.00	0.00	0.00	2.33	0.00
1982	0.00	0.00	0.21	0.35	4.24	3.18	21.43
1983	0.00	0.00	0.00	0.34	1.15	4.70	6.67
1984	0.00	0.00	0.00	0.68	1.13	3.49	25.00
2005	0.00	0.00	0.00	0.07	0.31	1.74	9.02
2006	0.00	0.00	0.00	0.00	0.30	0.81	13.33
2007	0.00	0.00	0.00	0.00	0.20	0.25	15.24
2008	0.00	0.38	0.38	0.49	0.81	4.09	27.27
2009	0.00	0.00	0.22	0.55	0.75	10.87	49.46
2019	0.00	0.00	0.00	0.11	0.00	1.49	29.61
2020	0.00	0.00	0.00	0.00	0.94	3.54	47.88
2021	0.00	0.00	0.00	0.00	0.00	0.52	10.99
2022	0.00	0.00	0.00	0.00	0.32	1.10	13.84
2023	0.00	0.00	0.00	0.11	0.17	1.24	30.89

Historical data considerations:

Defaults for Investment Grade ratings are very rare and hence individual data points need to be taken with care.

Source: [S&P Default, Transition, and Recovery: 2023 Annual Global Corporate Default And Rating Transition Study](#)

Complexity of credit modelling



Rating agencies

- Firms need to pay to get a rating from a rating agency. They might choose to get ratings from one or more rating agencies. Differences in default probabilities between rating agencies can arise due to:
 - Different rating assigned to the same firm
 - Differences in universe of firms rated by each rating agency
- There are also subtle differences in rating definitions, namely whether or not recovery is incorporated as a rating factor in evaluating credit quality (probability of default vs expected losses).

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1 year corporate transition rates

- Transition rates, which measure the change in a rating--including both upgrades and downgrades--over a given horizon, are another useful measure of ratings performance. Rating transition rates show that higher ratings tend to be more stable, while speculative-grade ratings generally experience more volatility.

2023 One-year corporate transition rates by region (%)

From/to	AAA	AA	A	BBB	BB	B	CCC/C	D	NR
Global									
AAA	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	96.81	1.42	0.00	0.00	0.00	0.00	0.00	1.77
A	0.00	0.15	96.78	1.02	0.00	0.00	0.00	0.00	2.05
BBB	0.00	0.00	1.61	92.68	0.97	0.43	0.11	0.11	4.09
BB	0.00	0.00	0.17	3.92	85.67	3.83	0.25	0.17	6.00
B	0.00	0.00	0.00	0.10	4.24	79.07	5.84	1.24	9.51
CCC/C	0.00	0.00	0.00	0.00	0.00	7.34	47.40	30.89	14.37

Source: [S&P Default, Transition, and Recovery: 2023 Annual Global Corporate Default And Rating Transition Study](#)

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1 year corporate transition rates cont.

- Occasional exceptions are usually due to outliers within smaller sample sizes or rare default events. For example, even though the default rate for the 'BBB' category for U.S. issuers (0.3%) was higher than that of the 'BB' category in 2023, the relationship still holds globally, where the 'BB' default rate (0.17%) exceeded that of the 'BBB' category (0.11%) in 2023. Sample size is an important consideration when analyzing transition rates.

U.S.									
AAA	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	95.80	1.68	0.00	0.00	0.00	0.00	0.00	2.52
A	0.00	0.00	96.66	2.16	0.00	0.00	0.00	0.00	1.18
BBB	0.00	0.00	0.67	93.84	1.47	0.54	0.13	0.27	3.08
BB	0.00	0.00	0.20	3.35	85.83	5.12	0.39	0.00	5.12
B	0.00	0.00	0.00	0.18	3.67	78.28	7.33	1.28	9.26
CCC/C	0.00	0.00	0.00	0.00	0.00	7.33	43.98	34.55	14.14
From/to	AAA	AA	A	BBB	BB	B	CCC/C	D	NR

Source: [S&P Default, Transition, and Recovery: 2023 Annual Global Corporate Default And Rating Transition Study](#)

Credit modelling: validation



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- Assess the modelled distribution for short and long term covering some stats including but not limited to
 - Long term mean credit spread
 - Long term standard deviation of credit spread
 - Long term mean excess returns
 - Long term standard deviation of excess returns
- Standard deviation and 95th/99.5th percentile of short-term excess returns of similar maturity (risk distribution of excess returns over one-year horizon)
- Long term and short term (over one-year horizon) percentiles of (change in) credit spreads
- Smooth projections over time
- Speed of mean reversion of credit spreads
- Fit to initial credit spread data
- Correlation of (change in) credit spreads between different credit ratings (for both one-year horizon and normative)
- One-year horizon and long term distribution of the transition and default probabilities

Credit modelling: challenges for developing markets



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- Models are calibrated to historical data. When selecting appropriate data, expert judgement is used. Data selection is a trade-off between two conflicting objectives: on one hand, using more data captures volatility and extreme historical movements, and therefore improves overall accuracy of statistical inferences; on the other hand, older data is less relevant to current conditions and future macroeconomic and market developments.
- Limited data window of corporate yield curves available for most economies and ratings is insufficient for a stable calibration.
- Spreads for a particular rating category might have very little liquidity, which would require replacing actual data with synthetic dataset, basing it on a “global” Option Adjusted Spread per rating. This means that for those economies where the global spread is the main data source, the outputs are fully correlated, but the projected spread levels would be different.

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Thank You