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Jin Oh is a Risk and Accounting Solutions expert in the Americas, focuses on impairment, stress testing, and capital planning solutions for both corporate and financial institutions. Jin is also involved in new solution design and development and has performed numerous CECL impact studies. She is also a subject matter expert for Moody's economic capital solution suite. Previously, she was in Advisory Services and led economic capital implementation projects. Previously, Jin has also led engagements on stress testing implementation for CCAR and DFAST institutions.

Can you quantify the impact of name or segment concentration on your portfolio?

Concentration risk has been a core concern for credit portfolio managers for decades. It's no secret that concentration risk can lead to significant losses in times of economic volatility because of correlated credit deterioration and defaults. This implies that these assets are not only correlated with the economy as a whole, but also with each other, resulting in higher risk of concentration and losses in times of stress.

Managing the concentration risk of a credit portfolio is an important component of a sound risk management process. One of the findings of our analysis shows that you can achieve a capital relief of 21% when you remove concentration impact. This equates to a 21% probability of reducing the overall risk of the portfolio by managing concentration risk. The quantification of concentration risk can help portfolio managers incorporate concentration impact into the risk-return profile of the individual assets of various segments and design portfolio strategies in line with the risk appetite framework. A certain amount of concentration risk is inevitable for any credit portfolio but can be proactively assessed and managed to maximize the risk-return ratio.

This paper discusses:

1. What is concentration risk?
2. How can you quantify the impact of concentration risk?
3. How can you utilize it for better strategic decisions?

1. What is concentration risk?

Concentration risk is the risk of loss resulting from a significant concentration of exposures, particularly with respect to a single entity or a single group of economically related entities, or with respect to a group of entities where the probability of their default depends on a common risk factor.

The impact of such common risk factors can result in substantial losses to a segment of a credit portfolio. The Office of Comptroller of the Currency (OCC) highlights in the Comptroller's Handbook that excessive concentrations of credit have been key factors in banking crises and failures[1]. The impact of risk concentrations is also integrated in the ICAAP process where institutions should be able to identify and assess concentrations that may arise from similar exposure across different regions, industries, business lines, etc. This will also help inform the sources and benefits of diversification in the ICAAP.

The concentration for a credit portfolio arises primarily from two types of imperfect diversification: name concentration and sector concentration.

- Name concentration relates to imperfect diversification of idiosyncratic risk in the portfolio, either because of its small size or because of large exposures to specific individual obligors.
- Segment concentration relates to imperfect diversification across systematic components of risk, namely geography and industry factors.

Material exposures to a few large names in the portfolio such as Enron and WorldCom led to a financial crisis for banks in the US in the early 2000s. High concentrations in certain sectors such as airlines and hotels led to substantial losses during the pandemic for financial institutions with high concentration in those sectors.

Portfolio-level risk assessment is critical to risk management and risk-return analysis as it accounts for both standalone credit risk of individual assets and the correlations of those assets to provide a true enterprise-level view of credit risk. Employing a correlation framework such as Moody's GCORR, which is an extensive inter- and intra-asset class correlation model, you can incorporate granular and reliable correlations into the portfolio credit risk assessment to capture the additional risk coming from name and sector concentrations. Basel II and Basel III also recognize the importance of correlations and concentration by requiring that banks with different levels of concentration risk should have different levels of capital and cover concentration risk explicitly under the Internal Capital Adequacy Assessment Process (ICAAP). Once concentration risk is captured in the overall portfolio risk metrics, the next step is to understand what is driving the name or segment concentration and the magnitude of the impact to manage and reduce concentration risk through portfolio strategies.

2. How can you quantify the impact of concentration risk?

When correlations are employed in portfolio credit risk assessment, the risk of an individual asset is captured through systematic risk and idiosyncratic risk:

- Systematic risk is the risk in common with other firms due to the state of the economy and is undiversifiable.
- Idiosyncratic risk is the net of the systematic risk or firm-specific risk that is diversifiable.

[1] See "Concentrations of Credit" Version 2.0 October 2020 by OCC https://www.occ.gov/publications-and-resources/publications/comptrollers-handbook/files/concentrations-of-credit/pub-ch-concentrations.pdf

Two firms with the same systematic risk will be affected to the same extent by an external shock, whereas their idiosyncratic risk will always be unique to each firm. In Moody's GCORR framework, systematic risk is defined by geography, industry, or property type.

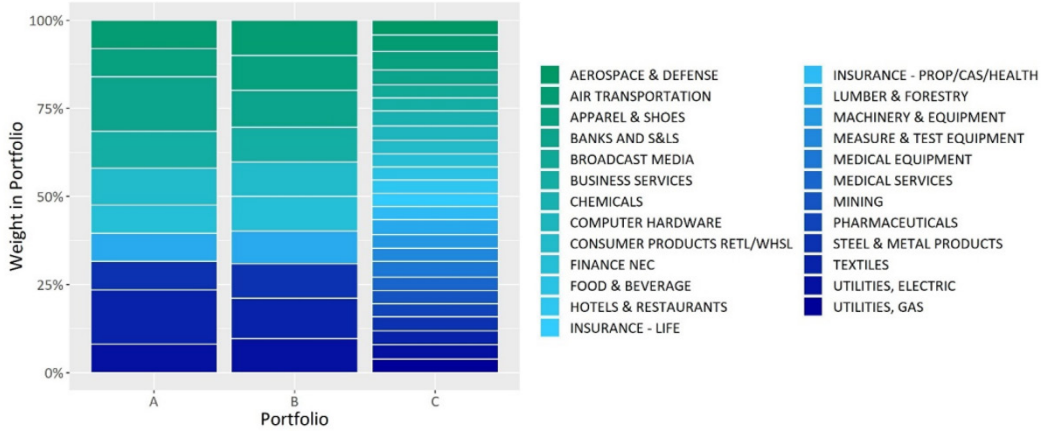
Name concentration arises when a portfolio contains large, single-name exposure where returns on individual exposures are more heavily correlated. In a portfolio where 10% of the total exposure is attributed to a single name, a large shock to this name could lead to at least 10% of the portfolio being affected. The key to quantifying name concentration is identifying the firm-specific or idiosyncratic risk. If the large, single name is broken up into smaller and less concentrated names with the same risk profiles and the same systematic risk exposure, they will have the same systematic risk but may not default all at once due to each name's unique idiosyncratic shocks. This reduces the probability of large losses below that of having one large name with the same total exposure amount. If the collection of these names continues to be broken into an infinitely granular portfolio, the idiosyncratic component is eventually fully diversified. This is how name concentration is quantified by comparing portfolio risk with the full idiosyncratic risk of individual names and without idiosyncratic risk, while maintaining the same level of systematic risk.

As with name concentration, a high exposure to one sector or one geography could also lead to extreme losses if there is a shock to the segment. Once the name concentration is removed, the segment concentration can be assessed and quantified. Each segment's concentration risk can be reassessed by removing the segment (i.e., industry or geography), and the new portfolio risk is compared to the original portfolio risk without name concentration to quantify the incremental impact of each segment's concentration risk.

Case Study

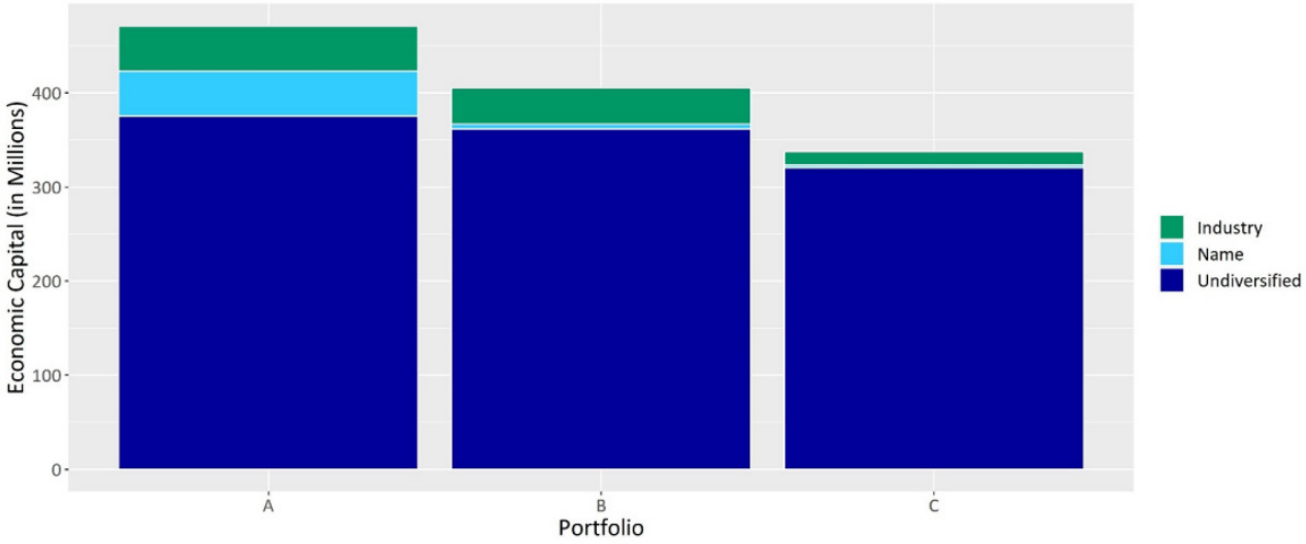
Three portfolios, A, B, and C are constructed to have the same total dollar exposures. Both A and B have ten unique industries, where Portfolio B has the dollar exposure more equally distributed across the industries.

Figure 1 Portfolio Composition



Portfolio C contains 25 equally weighted industries.
Leveraging the framework discussed above, the name and segment concentrations can be decomposed for each portfolio. The name concentration is assessed first, and each segment is quantified afterwards.

Figure 2 Name and Industry Concentration Analysis



Key findings here are:

- Despite the same total exposure amount, Portfolio A has the highest portfolio risk or tail risk (i.e., economic capital) due to its high name and segment concentration. Portfolio A also has the highest name and segment concentration levels compared to Portfolio B and C.
- Portfolio B is smaller than Portfolio A, despite having the same number of industries. It also has a more equal distribution of the exposure amount across the names and thus a smaller level of name concentration.
- The total portfolio risk of Portfolio C is the smallest, as both segment and name concentrations are much smaller. There are more industries and less dollar concentration for each name.

This case study demonstrates the importance of concentration management and diversification not only to reduce the portfolio risk, but also the name or segment concentration.

3. How can you utilize the concentration analysis?

The same framework can be applied to quantify the concentration risk for each name and each segment. This can be leveraged for various use cases.

Regulatory needs

Concentration is one of the focus areas for regulators around the world. Due to the standardized nature of the regulatory capital, regulators emphasize each bank's responsibility to measure, monitor, and control its credit risk concentrations explicitly with respect to capital adequacy under Pillar 2[2].

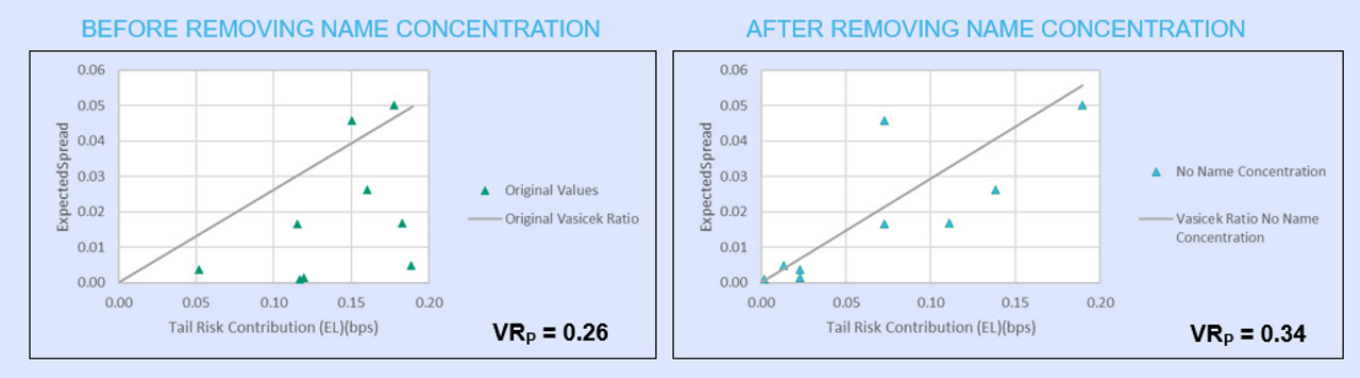
[2]See Basel Committee on Banking Supervision. Supervisory review process, SRP32, 15 Dec 2019

Notable regulators such as the EBA, ECA, OSFI, OCC, etc. expect financial institutions to implement appropriate methodologies and practices in line with their risk policy to aggregate the credit risk in portfolios, segments, business lines or names for credit risk concentration.

» Business needs

This exercise allows portfolio managers to better understand which name or which segment has the highest incremental risk impact on the portfolio even if the names or segments have the same risk profile. Depending on the size and the level of correlations, each name and segment can have different levels of concentration risk. This will then help portfolio managers make strategic decisions as to which name or segment exposures could be added to be most beneficial to the portfolio. By identifying the highest diversification benefit or worst concentration risk, you can effectively manage risk and in due course improve the risk-return ratio. Looking at the portfolio before and after the name concentration, you can see less variability in the risk-return across exposures while the risk-return ratio (described as Vasicek or VR ratio) also increases for the portfolio.

Figure 3 Profitability after Name Concentration



What is next?

Name or segment concentration analysis can help not only with regulatory needs but also business needs by managing the credit for the institution. It also enables institutions to plan portfolio strategies in line with their risk appetite. Moody's GCORR framework integrates comprehensive correlations across names and segments and identifies the impact of name and segment concentration on a credit portfolio. Contact Moody's Analytics today for additional information.

Find out more information about Moody's Analytics Portfolio Management products and solutions.