



Highly granular multi-factor modelling helps ensure optimal allocation of current and future funding

Empirically, we know that default and delinquency rates tend to peak around economic downturns. Following the 2008 crash, we saw very high rates of default in the residential and commercial real estate sectors. In a downturn, the defaults can be more pronounced or higher than expected loss for loans in similar distressed industries or asset classes due to correlations with each other or to the economic changes. In such circumstances an integrated framework can capture correlation effects both within and across asset classes.

A correlation framework allows for true portfolio risk assessment by capturing inter and intra asset class correlations; this means that given the same risk drivers, correlation allows for further differentiation between business opportunities. And beyond the identification of risks, a comprehensive correlation strategy allows for growth strategy analysis. It tells you which market (at the macro level) or which specific loan or investment (at the micro level) is less correlated with the risk profile of your current portfolio hence less risk, and therefore provides opportunities for growth.

Moody's Analytics has built a global multi-factor model providing asset correlations of obligors in a credit portfolio: GCorr. In our framework we capture significant cross-sectional variations across markets within an asset class. To take US commercial real estate borrowers as an example, we break these down into metropolitan statistical areas (MSA) and five property types: hotels, industrial, multi-family, office and retail. In doing so we notice significant cross-sectional variation in correlations across property types (e.g. hotels relative to offices) but also within property types across regions (e.g. San Francisco relative to Detroit). The same is true with other asset classes such as retail borrowers, where we see significant cross-sectional variation (across auto, bank card, first mortgage etc.) The more granular we get, the better our insights into where to expand, and where to decrease exposure. The correlation framework also captures the dynamics between asset classes.

There is another pattern that is important to understand: time dynamic correlations. In other words, based on where we are in the economic cycle, should we expect correlations to increase or decrease next year? And in which markets and asset classes? In general, correlations increase during a downturn (most clearly following the crash of 2008, but also during the pandemic) and then decrease during a recovery. When we compare different asset classes over time, however, we can observe significant differences. Both non-industrial and industrial companies showed significant asset correlation increase right after the 2008 crash, calming down in 2011-12. But during the pandemic, the non-industrial firms were hit much harder than the industrial companies – largely because there are many “high contact” companies in the non-industrial sectors, such as hospitality and retail, and many “low contact” companies in sectors such as manufacturing and process industry. Companies that are in related industries were impacted as well due to industry correlations and supply chain issues.

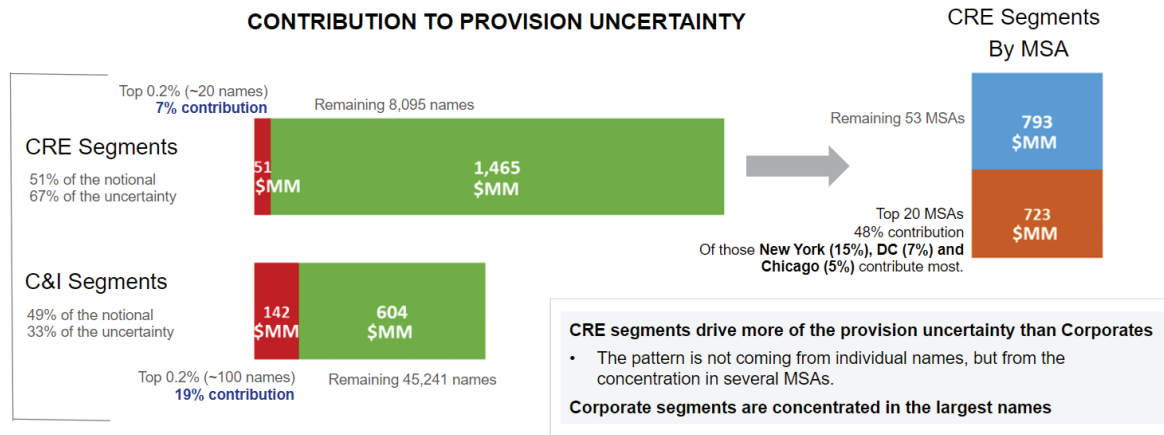
How to quantify

Using a model like GCorr, it is possible to identify correlations across asset classes and geographies etc. How can you quantify these to create a composite measure of risk for practical business use cases? Let's consider (see Figure 1) a portfolio with a 50-50 split in notional dollar terms between CRE and C&I segments. Our analysis shows that C&I contributes just 33% of the uncertainty or portfolio risk while the CRE segments contribute the other 67%. But what is driving the risk of the CRE higher? In our example, just 100 names out of 45,421 names which make up only 0.2% of the portfolio's holding amount account for 19% of the portfolio risk. Within C&I, the biggest risk to be addressed is concentration on the largest names. Within CRE's top 0.2% holding which has about 20 names make a significantly smaller contribution, 7%. A bigger risk driver for CRE is the metropolitan statistical area (MSA) with the top 20 of these (out of 73) making a 48% contribution to risk, with New York alone contributing 15%. In other words, the biggest risk that needs to be addressed appears to be the CRE concentration in several MSAs.

Figure 1 Identifying and quantifying the concentration drivers.

Identifying Different Concentration Drivers

Uncovering concentration patterns in the portfolio

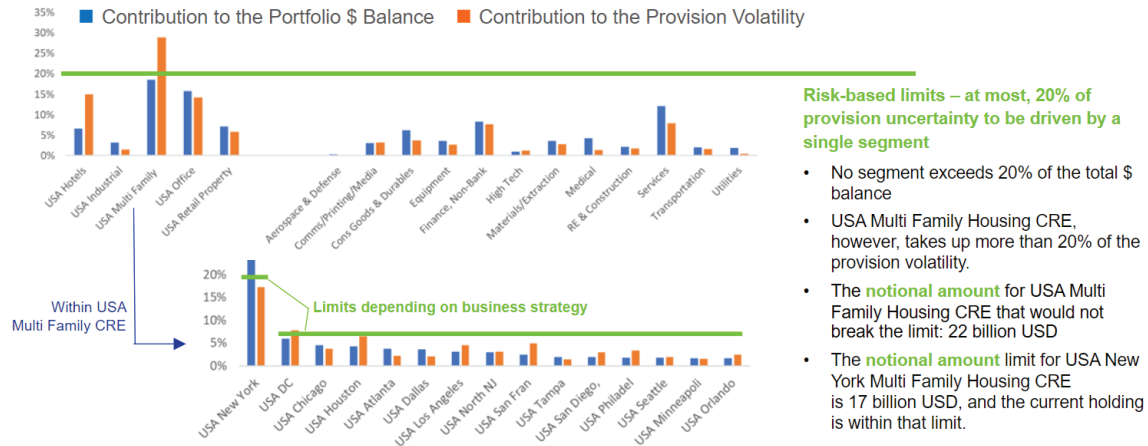


Let's put this type of analysis into a practice exercise. Say you decide that you don't want to invest more than 20% (in dollar terms) in any one segment. In Figure 2 this is represented by the blue bars, none of which reach the 20% threshold. So another dollar can be invested in the USA Multi Family segment. However, if the contribution to provision volatility (represented by the orange bars) is considered with a risk limit of 20%, the USA Multi Family segment is no longer an option, having breached the 20% risk limit already. With more granular data and correlations, one can truly see where risk concentration is higher or lower on top of the dollar concentrations to make a risk-driven business decision.

Figure 2 Setting risk-based limits in a credit portfolio framework.

Using the Concentration Analysis in Practice

How to set risk-based limits with a credit portfolio framework

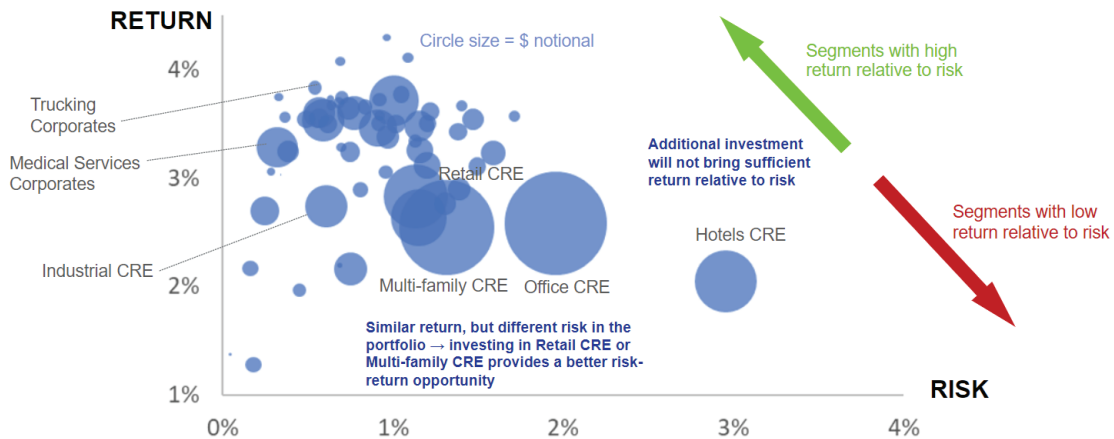


Finally, knowing the return over risk view of the portfolio helps understand which segment has the best contribution to profitability. If a segment has a relatively high risk but also generates high enough returns, this may be acceptable within your risk appetite. Figure 3 plots risk against return, with the largest segments in terms of notional amounts represented by the largest circles. Multi Family and Office CRE bring in a similar return along the same horizontal line, but Office come with a higher composite risk. If you have one extra dollar, it makes more sense to invest it in Multi Family in preference to Office, or even better, to one of the less funded segments appearing on the top-left of the chart (such as Trucking Corporates and Medical Services Corporates). New funds can thus be allocated in a way that raises profitability while reducing provision volatility.

In addition to funds allocation, such analysis will be invaluable when considering the impact of a merger or acquisition. Which institution's concentration profile will best complement your own?

Which Segment Has the Highest Return over Risk?

Where are the sustainable growth opportunities for your portfolio?



Concluding remarks

In summary, the dynamics and impact of correlations are generally more pronounced in a volatile period such as we are now experiencing. By understanding these correlations through market data for concentration analysis, we can leverage them not only to effectively manage risk but also to identify opportunities for growth. With the right technology and flexible modeling framework, this can be done in a repeatable and scalable way. A highly granular and comprehensive model is essential for correctly capturing the correlation dynamics not just within a single asset class but across segments and regions from a portfolio management perspective. The same model can be applied as the portfolio grows in size and footprint. In contrast to expected loss, which only reveals an average of all possibilities, this approach will help you to properly assess concentration risk and diversification benefits – information that will enable you to define and optimize your growth strategy.



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