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Authors
Jan Larsen
Sr Director, Advisory Services

Michael Denton
Director, Advisory Services

Contact Us
Americas
+1.212.553.1658
clientservices@moodys.com

Europe
+44.20.7772.5454
clientservices.emea@moodys.com

Asia (Excluding Japan)
+85 2 2916 1121
clientservices.asia@moodys.com

Japan
+81 3 5408 4100
clientservices.japan@moodys.com

A Hard Look at Low-Resolution Credit Scores

Banks using traditional credit scoring methods, with 8-10 total grades, appeared to fare well during the extended economic expansion from 2010-2019. Few borrowers failed in this period and write-offs were minimal. Yet, during that period a trend emerged toward the use of high-resolution credit scoring (HRS), using quantitative models, typically in a dual risk rating (DRR) framework. Banks that have made that transition were generally seeking improved underwriting capability, access to early warning indicators, and/or enhanced portfolio management capabilities.

But the real value of the greater credit scoring resolution may soon become clear if the global economy continues to veer toward increasing turbulence and a harsher credit environment. Low-resolution methods fail to differentiate among mediocre credit quality borrowers, which are the most likely to become Substandard and Doubtful borrowers in a downturn.

This paper addresses:

» How low-resolution approaches disguise credit quality in good times

» Portfolio risk escalation in economic downturns

» Harvesting value from an HRS approach

» The process for migrating to a high-resolution approach.

Default Rates and Credit Scores

While most commercial bank loans have been extended to private firms and projects, it is instructive to consider the default rates over time for entities rated by Moody's Investors Service. What these reveal is that differences in credit quality are far more pronounced in economic downturns, as shown in Figure 1. Baa-rated credits, which often are similar in credit quality to the stronger names in a commercial bank loan portfolio, defaulted at a rate of only 8 basis points (bps) through the recent bull market, but at a rate of almost 1% during the Great Recession.

Figure 1 Traditional risk ratings versus high-resolution scores

REGULATORY CLASSIFICATIONS	TRADITIONAL RISK RATINGS	HI-RESOLUTION SCORES	HISTORICAL DEFAULT RATES 2008-2009	HISTORICAL DEFAULT RATES 2010-2019
Pass	1	Aa1		
Pass	1	Aa2	0.25%	0.02%
Pass	1	Aa3		
Pass	2	A1		
Pass	2	A2	0.32%	0.03%
Pass	2	A3		
Pass	3	Baa1		
Pass	3	Baa2	0.98%	0.08%
Pass	3	Baa3		
Pass	3	Ba1	1.16%	0.09%
Pass	4	Ba2	2.29%	0.10%
Pass	4	Ba3	2.77%	0.38%
Pass	4	B1	3.21%	0.37%
Pass	4	B2	5.61%	1.08%
Watch	5	B3	6.80%	1.21%
Special Mention	6	Caa	26.89%	8.09%
Substandard (Accrual)	7	Ca	52.98%	37.90%
Substandard (Non-acc.)	8	C		
Doubtful	9	NR		
Loss	10	NR		

Source: Moody's Investors Service, "Default Trends – Global: Annual default study: Defaults will edge higher in 2020", Exhibits 40, 41, 42.

Looking at the Ba1-to-B3 credit spectrum, we see that from 2010 to 2019 the difference between the Ba1 and B3 default rates was only about a percentage point, while in the Great Recession the difference was more than five percentage points.

The "compression" of default rates across a range of credit scores in bull markets tends to lead banks toward unknowingly assuming levels of risk that can quickly escalate in a downturn. When differences in credit quality appear small (in good times), a bank's focus can shift toward increasing volume and away from careful risk assessment. The recent low interest rate environment and flat yield curve have compounded this problem, as banks have become hungry for new sources of yield, making riskier segments more attractive.

Practitioners with long memories, however, recognize that credit risk assessment is really about detecting pre-existing conditions. The highly leveraged entity with a spotty profitability record and mediocre management will probably lumber through a favorable economic environment just fine. However, during the next downturn—whose nature and timing is always extremely difficult to predict—the story may be different. The power in HRS largely lies in the ability to detect profitable credits that will be resilient through the next downturn.

Credit Scoring Resolution

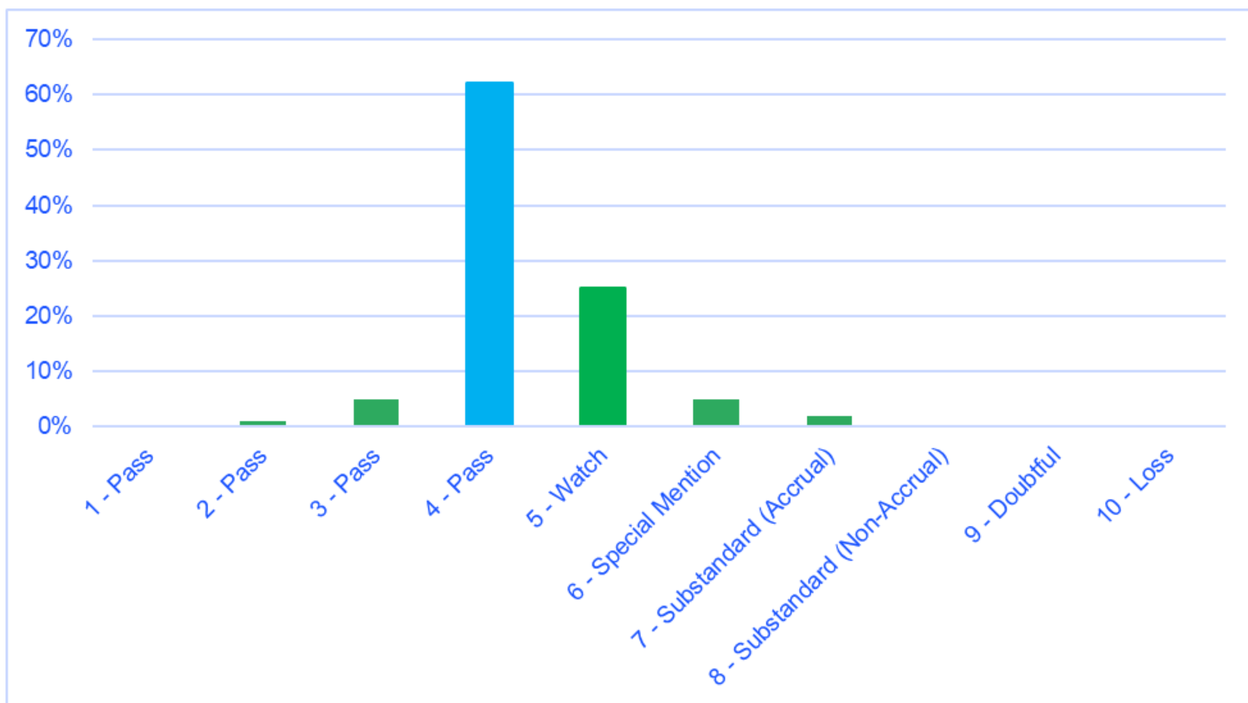
At a high level, risk rating practices can be divided into two categories: traditional risk rating (TRR) and high-resolution credit scoring (HRS). In TRR, a single rating is assigned to each exposure in the portfolio, accounting (in theory) for both default risk and recovery risk. In HRS, each obligation is typically rated based on default risk, while recovery risk is treated separately (see sidebar). The overwhelming majority of banks in the United States use TRR, but HRS is the predominant practice for banks with over $25 billion in assets and is becoming increasingly common for banks in the $7 billion to $25 billion range.

Banks usually choose to implement HRS in the context of a dual risk rating (DRR) system. In DRR, each obligor is rated based on default risk, while each facility is rated based on recovery risk. A typical DRR system has 10-15 Pass grades for default risk and 8-12 total grades for recovery risk. However, many banks implement HRS as an intermediate step toward full DRR. In these cases, the bank rates obligors based on default risk and accounts for recovery risk either through blanket assumptions for loss given default (LGD) or through collateral haircut tables. While DRR is the gold standard for internal risk rating, banks that implement HRS in advance of a highly developed facility rating program still realize tremendous value from risk rating granularity. Moreover, if the HRS is well-designed with a view to the future, an eventual migration to DRR only involves developing facility scorecards and a facility rating scale, rather than revisiting any obligor scorecards.

While there are a number of approaches to TRR, what they all tend to have in common is a lack of resolution or granularity in the Pass grades, with frequently four or five total Pass grades. In practice, the portfolio's loan grades are usually highly concentrated in the two lowest-quality Pass grades. This happens for a fairly straightforward reason: if there are five Pass grades (1 to 5), the bank's underwriting standards will typically encourage the origination of 4-rated credits. So, in practice, most banks in the United States presently have a grading scale with only two Pass grades, one of those being "Watch" (see Figure 2 for an illustrative example).

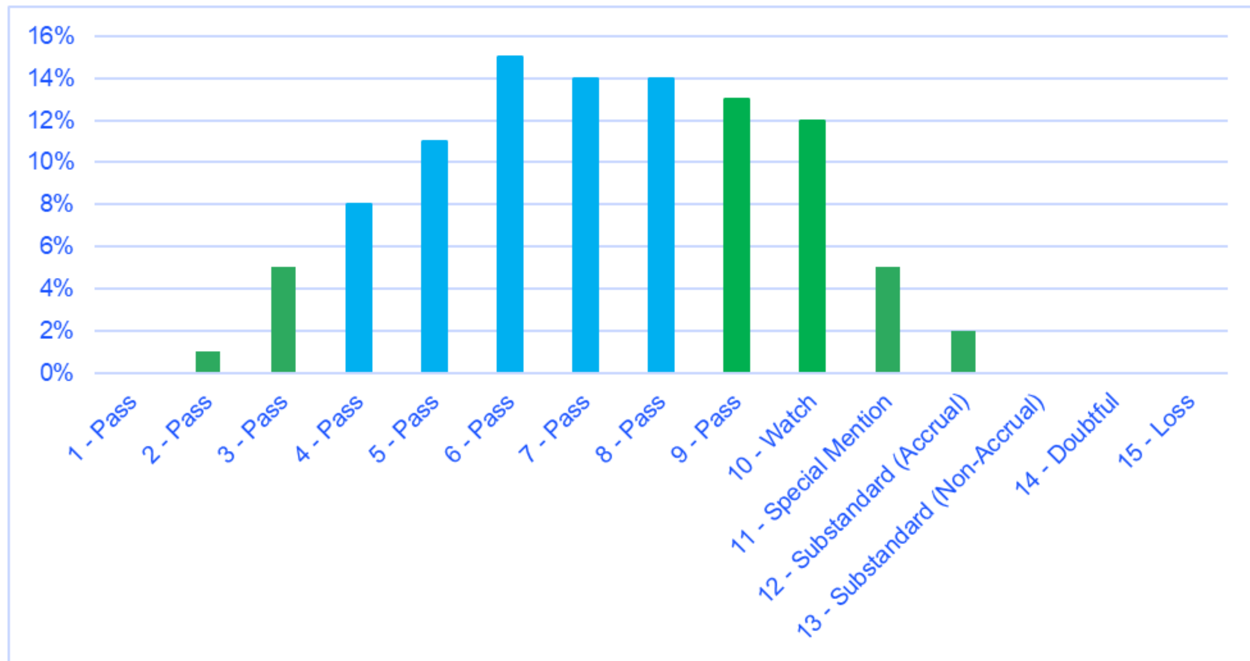
This simple approach usually appears to work well in good times, when credit quality is compressed and default rates are low across the board. Unfortunately, the shortcomings of TRR are often revealed in downturns, when it becomes clear that not all 4's are alike.

Figure 2 Typical TRR grade distribution



Source: Moody's Analytics.

Figure 3 Typical HRS obligor grade distribution



Source: Moody's Analytics

In an HRS system, all obligor grades are mapped to a quantitative metric: the probability of default (PD).[1] Because the grades are mapped to objective, quantitative metrics, it is possible to define many more of them. Most banks using HRS have 10-15 Pass grades for obligors in addition to the standard 4-5 Non-pass grades (see Figure 3 for an illustrative example). The grades themselves are assigned through scorecards.

Obligor scorecards typically consist of a financial statement-driven statistical model with a qualitative overlay to capture non-financial factors (such as management quality). However, "qualitative" does not mean the same thing as "subjective." Qualitative factors should be defined as objectively as possible (for example, "How many downturns has current management successfully navigated in their current industry?").

Because of their increased granularity, HRS systems are far more effective at differentiating levels of risk. Rather than concentrating all credits into just two risk grades as in a common TRR system, in an HRS system the goal is usually to avoid any more than approximately 20% of exposure in any one grade.

Increased Resolution Drives Shareholder Value

The value of a robust ratings system is being able to detect, in good times, which obligors are most likely to survive the next downturn and which are most likely to falter. A firm or project might get by with high leverage and thin liquidity in a boom period, but will be vulnerable the next time the economy weakens. The business benefits of increased granularity in the Pass grades extend through all stages of the credit lifecycle:

» **Underwriting:** Ability to detect borrowers more susceptible to downturns

» **Early warning:** Ability to observe credit deterioration before borrowers hit the watch list or worse

» **Portfolio management:** Ability to observe credit quality trends by segment, ensure resiliency of the portfolio, and compare performance of business lines on an apples-to-apples basis

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[1] In a DRR system, each facility grade is further mapped to a loss given default (LGD).

- **"What-if" capability:** Model-driven scores can be scenario-conditioned to better understand extreme event impacts, correlations, and potential corrections

An HRS system, driven by a mixture of statistical techniques and expert judgment, gives banks the early warning indicators and portfolio management techniques they need to maximize profit during good times while ensuring their portfolios are constructed to survive the next downturn.

At the underwriting stage, an HRS system can yield far greater insights into which customers are most likely to be resilient through a downturn. Figures 1 and 2 show that TRR systems compress a range of credit quality into just one or two grades. By identifying which previously 4-rated credits are stronger or weaker than others, a bank can more effectively think about pricing, covenants, and perhaps whether the customer is even desirable. This puts an HRS bank at a clear competitive advantage in any environment, but especially in a downturn when differences in credit quality tend to manifest themselves most profoundly. In stark terms, an investment in an HRS system can be the difference between a bank looking to acquire distressed competitors in the next downturn versus the bank being acquired.

Once the credit is extended, HRS provides powerful credit monitoring capabilities, particularly for early warning. In the TRR scale in Figure 2, the bulk of the portfolio is concentrated in Watch or in the next-best Pass grade. This means the overwhelming majority of future downgrades will be to Watch or Non-pass. In other words, the TRR scale cannot relay any early warning information; it can only alert a bank when something has already gone wrong.

The HRS scale in Figure 3, on the other hand, draws attention to faltering credits well before they hit the watch list or Non-pass status. Since most credits are originated at a grade of 7 or better, a bank can detect credit deterioration while credits still remain in the Pass grades, allowing for earlier risk-mitigating interventions. For example, if a credit is originated as a 4 but next year it scores as a 7 (which is still a Pass grade in Figure 3), that can be a signal to a bank relationship manager to get a jump on understanding any customer challenges.

Banks can do a similar analysis at a portfolio level. For example, if a bank sees a preponderance of downgrades in its Phoenix office property portfolio, it may reconsider how much additional business it wants to do in that segment in the near term.

Moreover, since in an HRS system the obligor rating definitions are based on the same default probability ranges across all commercial portfolio segments, it is much more straightforward to compare the profitability of different segments. For example, in a bank using TRR, it is very common for a 4 in the commercial real estate construction segment to be riskier (on average) than a 4 in the middle-market segment. In an HRS system, a 4 has the same interpretation for both middle-market clients and construction (for example, a default probability of 25 bps to 50 bps). Management can then directly compare the yields on middle market and construction by grade to determine which is adding more shareholder value. This can then drive decisions about choosing a segment in which to invest more heavily, as well as decisions about which businesses may require better underwriting and pricing discipline.

Through improved underwriting practices, early warning capabilities, and portfolio monitoring applications, HRS drives shareholder value by guiding a bank to enter more profitable relationships and by helping to detect problems early and mitigate losses. While for some banks, regulatory guidance is a primary motivating factor in moving to HRS, the overarching motivation should be to deliver superior shareholder value.

Managing Cultural Change

At this point, the value proposition of HRS should be clear. But what are the key challenges in migrating to HRS?

The biggest challenge is usually in managing cultural change within a bank. Lending officers are often skeptical of moving from a TRR system that they view as transparent and which gives them a large measure of control over their customers' risk ratings, to an HRS system driven largely by statistical models. These lending officers often feel they have greater insight into their borrowers than a model, and fear that they will see downgrades and grade volatility in their books—and perhaps some existing clients may no longer qualify for credit.

The best solution to this problem is to adopt an inclusive and transparent scorecard design process. While the statistical portion of the scorecards will typically be prescribed by an external vendor or a team of quantitative analysts, there is plenty of room for input on the qualitative overlays. Including a broad constituency in this design process is a powerful way to achieve buy-in on the final product. Business line heads, senior credit officers, loan review officers, and risk management should all be included.

Once a preliminary scorecard has been developed, further transparency can be achieved through case studies. Credit officers should be asked to rate a sample of loans through the scorecard and examine the resulting rank ordering. To the extent rank-ordering is counterintuitive in isolated cases, credit officers should explain why they think a lower-rated credit is stronger than a higher-rated one. If the reason is idiosyncratic, there is no need for concern because that would be captured in overrides. However, if the same systematic factor is associated with multiple discrepancies (such as supply chain risk), that may indicate the need to revise the scorecard to include the factor.

While this does involve a time commitment, HRS banks have found the business benefits to easily justify the upfront investment. In addition to the underwriting, early warning, and portfolio monitoring advantages described in this paper, HRS banks have applied their more granular and accurate risk grades to drive more accurate allowances, more competitive loan pricing, and detailed stress testing, all of which contribute directly to shareholder value.

Using a traditional risk rating framework necessarily creates significant compression in the range of default probabilities covered by the last one or two ratings above “Watch.” As a result, a bank cannot distinguish among the best or worst credits within those groups. In a benign credit environment, there are few defaults in those groups, and the need for better monitoring and preparation for the inevitable credit downturn remains hidden.

Many banks have made the transition to a high-resolution credit scoring methodology, and have realized great value in the newfound ability to differentiate risk among their “Pass” credits. That transformation is typically accompanied (or led) by a few key changes in the culture of how credit origination and monitoring take place. With planning and internal alignment, banks have been reaping the benefits of improved underwriting, early warning metrics, portfolio steering, and the use of what-if analytics.

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