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## Reverse Reengineering of Risk

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When credit-risk scoring came into usage in the 1970s, it ushered in an era of science-based decision making that was primed to end the judgmental and biased lending decisions of the past. As the recent mortgage crisis has exposed, the science of risk scoring needs some tweaking. The industry needs to add critical measures of financial soundness to scoring and re-embrace common-sense judgment. Doing this won't turn back the clock to the days of restrictive lending-or demonize creative lending products-but will lead to sounder lending practices that will help the housing market recovery more quickly.

The magnitude of the current crisis makes it abundantly clear that there is significant room-and need-for improvement in current credit-assessment approaches. There are two fundamental problems that contributed to the weakened underwriting standards and degraded loan quality. First, credit scoring has not done an adequate job of assessing risk in the subprime mortgage market. Most subprime mortgage underwriting systems were not, in fact, capturing the full range of risk factors in the market. This was particularly true when their conventional risk models were applied to non-conventional loan products, which are associated with different payment terms and behavior. Lenders who depend on these credit-scoring systems were measuring credit risk inaccurately and incompletely. Second, there is a blind spot in today's underwriting practices. Current practices rely too heavily on quantitative models and automated underwriting systems. Technology has a vital role to play in boosting efficiency and helping measure and monitor credit risk, and the models have their place and role to play. However, institutions must control the models instead of the other way around.

Loans need first to be properly classified, and then risk rated. Today's process has that backward.

## ADOPTING A MORE COMPREHENSIVE APPROACH

As the accuracy and power of the FICO score continue to be debated, what's needed are new and improved ways of addressing limitations of credit-scoring systems and better evaluating of credit risk. Simply recalibrating existing models and throwing technology at the problem will not fix it. A comprehensive new credit-risk framework is needed—a hybrid approach that combines the best that technology can offer with expert human judgment. Such an approach can help deal with the current crisis and may lessen the extent of, or even prevent, the next one. This approach is the comprehensive credit assessment framework (CCAF). The CCAF uses advanced computing technology and a sound, safe model development and validation process. The robust and flexible CCAF approach naturally affords a sustainable and sensible segmentation based on all primary credit factors and then offers a systematic means for taking appropriate actions relative to those identified segments. It also provides ongoing monitoring of the impact of those actions in a comprehensive and efficient manner.

CCAF accomplishes this by first expanding the boundaries of information. Our risk models need to include income and secondary examples of good payment behavior, like utility payment history. The industry also needs to factor in borrowers' capital. And it needs to stop dunning people for getting a better-paying job by putting them in the credit "penalty box" if they've held the job for less than two years.

Second, CCAF appropriately segments loan applicants based on primary factors. A client with a lot of debt—and a lot of capital—should be in a different segment than a customer with the same debt load but little capital. The argument from the 1970s that income isn't a good indicator due to inflation no longer holds water.

Next, CCAF will layer in needed secondary qualification factors. Research has shown that people who operate on a cash basis—they pay with cash and they save—don't get the best terms as compared to those who carry installment debt. Yet "cash basis" borrowers will often be better risks. Bank balances and a history of automatically deposited savings need to be added considerations in modeling risk.

Fourth, CCAF assigns actions for each identified segment. In the recent past, lenders have focused on finding the loan with the monthly payment that a borrower could afford. Instead, lenders need to focus on matching the borrower to a loan product that the borrower will be most successful at paying off.

Fifth, CCAF puts in place an adaptable policy mechanism that is responsive to the evolving economic climate. Lenders need a model that has a feedback mechanism. It should factor in what segments are defaulting with what loan products and bring current economic conditions-interest rates, local unemployment rates and local housing price escalation or de-escalation-to bear in deciding who qualifies and under what conditions.

Finally, CCAF models future scenarios to determine whether the borrower can tolerate actions like interest rate resets. Credit scoring looks at the past. CCAF looks at the best case, worst case and most likely scenarios for different types of loan products. For instance, a lender can model the "worst-case" scenario for an interest rate increase, reset for an ARM and determine-based on the home's value and the borrower's assets today-whether the borrower could tolerate the reset. This could help lender and borrower avoid a loan that has a stronger potential for creating hardship and foreclosure.

Historically, scoring system developers focused on which loans were bad loans as defined by the lender vs. just looking at defaulted loans. As a result, the definition of bad loan performance was stretched to include any accounts that were ever delinquent 90 days, twice delinquent 60 days or three times delinquent 30 days. This is where a problem arises. Today's scoring systems still include in the bad loan sample "purely delinquent" as opposed to "actual defaulted" loans. Hence, wealthy people who choose to pay late for convenience (and don't mind the late-fee penalties) get thrown into the bad loan pool. When a model is built on good and bad loans, then, it turns out that income and capital are not predictive. This is self-fulfilling based on the way the model samples are constructed. It is interesting to note that the most profitable credit card customers are those who revolve their balances and pay lots of late fees.

## DEVELOPING A 360-DEGREE VIEW OF THE BORROWER

The industry needs a model that looks at customers holistically, that benefits consumers who practice sound personal finance and that is easily understandable to consumers and lenders.

Credit scoring can be part of the solution, but not the solution itself. Credit-scoring models can

be used to categorize and assess the risk in one or more dimensions in the framework. CCAF may be viewed as an "enhancement" rather than a "replacement" of the current credit evaluation system.

Let's look at how the two systems operate. CCAF determines which risk factors pertain to the lending decision within the context of each borrower's situation and the loan product parameters, and then appropriately adjusts the factor weightings to produce the right outcome. As such, CCAF considers hundreds of different borrower segments individually and determines secondary factors within that context. In contrast, credit scoring has a fixed number of factors that have a constant set of point weightings that are automatically applied to every credit applicant regardless of their qualifications. Credit scoring is actually averaging results over hundreds of segments, ignoring individual differences and treating everyone the same no matter how they differ based on primary factors tied to sound lending principles.

Because so much weight is applied to carrying and paying revolving debt, two candidates with very different qualifications can score the same. Here's a good example: Suppose Borrower A has \$1 million in capital, earns \$200,000 a year, has \$3,000 in additional credit card debt and \$7,000 in additional installment debt, and is purchasing a home as a primary residence that is priced at \$390,000 with an interest-only 5/1 ARM. Borrower B has no capital, earns \$100,000 a year, also has \$3,000 in additional credit card debt and \$7,000 in additional installment debt, and is purchasing a primary residence that is identically priced and financed and is in the same subdivision. While they both have identical credit bureau scores of 712 at one of the three major credit bureaus, borrower B intuitively has a higher probability of default.

Here is another example. Because income as a scorecard variable was deemed to be "inflation-bound," major scorecard developers chose not to include it in the scorecard. In other words, scoring assigns points based on absolute thresholds, income that is indicative of good loan payment behavior today may prove to be insufficient in a relatively short period of time, and steady inflation would translate to steady performance degradation for the system. Since scoring systems can leverage on the correlation between different factors in predicting outcomes, the story line was that income was no longer predictive versus other alternatives. On that score, it is inaccurate to say that income is not predictive; rather, it was determined that surrogates for income existed that could be substituted in a model. When a factor like years on job is in a scorecard, it usually exhibits illogical results. Sound personal financial practices, like closing an unused old credit card line, can also adversely affect a score.

CCAF is more comprehensive and transparent. This allows risk-rating credit transactions within that complete context, including transaction and borrower contours. It fosters financial education and literacy by letting the borrower know how he or she is classified and ranked according to relevant, causally linked primary factors (income and debt ratio, for instance). It also shows borrowers how their proposed loan is classified vs. other possible loans for which they would be qualified. Currently, it is meaningless to tell someone their credit score because loan officers can't say what went into the ranking, except that it was based on incomplete information (credit bureau data only) instead of all relevant information such as capacity, capital and collateral. The score is not readily interpretable, as the models are considered proprietary.

For lenders, CCAF offers better control of loan decisions. They can use expert judgment with statistically based criteria in the risk-evaluation process. The process encompasses not only default risk but also concentration risk, fair lending non-compliance risk and a host of other important objectives. Specific thresholds can be enforced at the segment level to limit risk exposure. As a result, significant overstatement or understatement of risk on individual loan transactions can be avoided, as can unacceptable levels of risk across all portfolio segment levels.

For both parties, it is particularly important to identify loans that are truly affordable relative to every borrower segment. Since the crisis has emerged, critics of the mortgage industry have decried certain kinds of products-like zero-down-payment loans-and claimed that if these products didn't exist the industry wouldn't be in such dire straits. CCAF doesn't demonize products. Instead, it allows lenders to match risk to customer segment. It isn't necessarily risky to offer a newly minted neurosurgeon with a disability policy and a lot of student debt a no-down-payment ARM loan on a pricey condo. It isn't high-risk to offer an interest-only ARM to a person with strong capital reserves who puts 10 percent down on a rental property purchased below the appraised value. In contrast, borrowers with zero cash reserves, living paycheck-to-paycheck with a 36 percent debt ratio should not be put into an interest-only option ARM.

## USING CCAF TO EXPAND LENDING OPPORTUNITIES

Some argue that adding segmenting and allowing lender judgment to enter mortgage decisions will negate the great strides made in fair lending. Lenders entered the subprime mortgage market believing that the science of credit scoring could allow them to extend credit

to individuals who would not otherwise make the cut. Now that lenders have been burned, they are pulling out of this critical market to the detriment of low-income and some minority borrowers. By using CCAF, the necessary risk measurements can be put in place to again allow lenders to enter this critical market. Of equal importance, by viewing the borrower "holistically," CCAF standards can open the prime market to young people and recent immigrant groups. An August 2007 report from the Board of Governors of the Federal Reserve noted the problem these groups face with current credit-scoring methods. Bankers who don't want to be dunned for not meeting Fair Housing Regulations need to insist on better ways of judging low-income borrowers. Finally, a segmented approach has garnered the attention of government officials. David Nason, Assistant Treasury Secretary for Financial Institutions, recently said that the industry has "to be able to segment a population in a way that can create long-term solutions."

CCAF's systematic segmentation approach has implications for both intervention in the mortgage crisis and prevention of future financial disruptions. CCAF can be applied to existing troubled mortgages as a way to segment troubled loans (bringing in additional data that wasn't included in the original loan application) to determine which can be salvaged and then measure the success of this effort to improve the ability to predict loan default. It can reduce future financial disruptions by providing a framework for judging the value of mortgages that are bundled for securitization and sale. With the secondary market nearly collapsed, CCAF offers superior risk measurement through a sensible and transparent process that best serves the broadest spectrum of today's credit market, prime and non-prime alike. The segmentation approach embraced by CCAF is a proven winner in other business areas, such as marketing. Many banks already segment their customers to up-sell, cross-sell and increase ROI in marketing efforts. CCAF can similarly increase ROI while doing a much better job of understanding the true risk involved in offering different types of loans.

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Ultimately, creating a sustainable long-term solution is what CCAF is about. CCAF ensures comprehensive classification of borrowers and loans relative to the major categories of factors linked to loan default risk as a prerequisite to risk quantification. CCAF doesn't allow modeling of payment habit or loan preference history to substitute for critical risk metrics like capacity and capital. Can any lender truly believe that payment history on a revolving charge card can adequately replace direct risk measures such as debt ratio, income, net worth and liquid reserves? The fact that CCAF is validated from both a qualitative and quantitative basis and monitored for any signs of predictive decay or compliance violations ensures that it will perform at least as well as expected relative to credit risk measurement, responsible lending and fair lending.

CCAF's holistic classification affords transparency, conveys the essence of the borrower's qualifications and risk rates credit transactions within that complete context. As a result, significant overstatement or understatement of risk on individual loan transactions can be avoided. CCAF affords greater control of loan decisions through its ability to integrate expert judgment with statistically based criteria in the risk-evaluation process, encompassing not only default risk, but also concentration risk, fair lending non-compliance risk and a host of other important objectives. This allows for efficiency, transparency and accuracy. It allows lenders to use common sense and borrowers to be rewarded for sound personal finance decisions.

Clark Abrahams is chief financial architect for SAS' Financial Services Business. (c) 2008 Bank Technology News and SourceMedia, Inc. All Rights Reserved.

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