"What Borrowers Need to Know About Credit Scoring Models and Credit Scores"

Testimony of Clark Abrahams, Chief Financial Architect, SAS Institute, Inc.
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Chairman Watt, Ranking Member Miller, and other distinguished Members of the

Subcommittee, I am Clark Abrahams, Chief Financial Architect at SAS, a leading provider of

business intelligence and analytical software, based in North Carolina. SAS has more than a

quarter century of experience providing decision-based support to the financial services sector.[1] In

terms of my own personal background, I have twenty-five years in the credit assessment and

banking business, and another ten years in consulting and software development. On the technical

side, I have developed, or directed the development of, thousands of credit models in my career.[2]

On the business side, I have served on corporate and board-level loan committees, developed and

enforced credit policies, and dealt with customer and shareholder concerns. I have personally

conducted corporate loan policy assessments for consumer and commercial lending under

regulatory supervision, managed the liquidation of bank assets comprised of defaulted loan

collateral and have had to deal with disposal of assets associated with all aspects of defaulted

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[1] With more than 30 years of experience in financial services, SAS works closely with top financial institutions to provide timely solutions that address critical business needs. In the financial services industry, SAS data integration, fraud detection, risk management, regulatory compliance, Customer Relationship Management and other software is used by more than 3,000 financial institutions worldwide, representing 97 percent of banks in the Fortune Global 500. SAS' industry expertise is evidenced by long-term relationships with large and medium-sized banks and financial institutions. Furthermore, financial services is SAS' largest industry segment by revenue, contributing 42 percent of the total company worldwide revenues of $2.15 billion in 2007.

[2] These include: 1) credit scoring systems for secured and unsecured lending, 2) credit validation and monitoring systems for assessing underwriting performance, 3) scorecard adaptability assessments, 4) consumer credit auditing models used to assess of judgmental model decisions and loan grading, 5) post-scoring judgmental extensions to credit bureau scores and custom application credit scores to increase automatic approvals 6) behavioral and econometric credit loss and loan pre-payment forecasting, 7) commercial loan grading and default estimation, 8) loan portfolio sub-prime concentration risk to capital, 9) valuation of credit card portfolios for sale, 10) construction and quality assessment of credit card securitizations, 11) fair lending disparate treatments testing for mortgage loans and override analysis for credit scored HMDA-reportable loans, 12) fair pricing analysis and overage/underage statistical testing for mortgages.

loans, including foreclosure proceedings. In my current position at SAS, I have conducted research and helped to pioneer new software solutions in the areas of credit granting and fair and responsible lending assessment.   The breadth of my experience has afforded me a multi-faceted perspective of the issues currently discussed by Congress, and being felt by the nation. Based on all of my experiences, I believe there are opportunities for improving credit risk measurement, with the added benefits of more accurate assessment of fair and responsible lending, and advancing financial literacy of consumers.

I very much appreciate the opportunity to testify before you today on the important issue of credit scoring and fostering better understanding of the credit modeling process and the interpretation of credit scores. Credit markets are influenced by what information is made available and also by tools that are used to manage and analyze that set of available information. Therefore, I want to acknowledge the contributions made to affording the ready access to historical credit information provided by Experian, TransUnion, and Equifax and the pioneering work by Fair, Isaac, and Company. Over the years I have been privileged to work with all of them. Their efforts have unquestionably resulted in far greater access to credit for many consumer segments. As with any new idea, in order to make the case for a change I must necessarily point to areas where improvements can be made. I believe that the road to improving the current credit system is paved with greater information, illuminated by innovation, and built through collaboration.

My objective for testifying today is to discuss how the credit scoring process can be enhanced to help consumers, financial institutions, and regulators better measure and understand risk. The current system has met many needs and continues to be appropriate in many situations.

Like most things, however, our current system can be improved to provide both a more effective measurement and a better understanding of borrower risk, loan portfolio risk, and credit concentration risk at the enterprise, regional, industry, and national levels. This will be critically important to regain and maintain financial stability going forward. [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." I wholeheartedly agree with Assistant Secretary Nason, and have devoted a great deal of energy to create some applicable segmentation examples and a computer-based methodology that can leverage any segmentation scheme to measure, monitor, and control credit risk for the lender, while thoroughly identifying for consumers how they rate overall, and also relative to the primary loan qualification factors.

Over the past five years I have been conducting research on this subject and developing software solutions for the marketplace at SAS. My initial focus was actually on fair lending statistical analysis, including development of a singular measure that captures all fair lending risk,[3] a systematic approach for fair loan pricing analysis, and an enhanced regression model that more effectively captures how lending policies are applied to loan approval and pricing decisions, resulting in better predictive power and a reduced chance that patterns of potential disparate treatment will remain undetected. As a by-product of this research, it became clear that if the credit underwriting system could segment borrowers into homogeneous risk groups relative to their credit qualifications, and the givens of the loan transaction; and if that system could also decision the loan applicant and price the risk of the loan according to that segmentation scheme, then the fair lending analysis would be considerably simplified. A Comprehensive Credit Assessment Framework (CCAF) accomplishes this objective, because it groups similarly situated borrowers

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[3] based on HMDA, US Census Bureau, and credit underwriting data

relative to primary factors in the loan underwriting process, better ensuring that all loan applicants are evaluated fairly and consistently. As a result, all fair lending disparity indices, including decline and above-trigger pricing should be close to parity within each of CCAF's borrower segments.

Underwriting Gap

Today there is an underwriting gap in credit evaluation and loan underwriting practices, and a more comprehensive approach is needed. The underwriting gap refers to the difference between the underwriting decision model and the borrower, the business and market realities. The realities I refer to encompass how well the loan approval and pricing process meshes with: 1) borrower objectives (such as home ownership), their true credit qualifications and the sacrifices they are willing to make to attain their objectives, 2) the lender's business objectives, risk tolerance and policies, and 3) the ever changing levels of market prices, interest rates, loan demand, and liquidity. Narrowing this gap will result in more accurate loss and default predictions, fairer treatment of the customer and less reliance on pure scientific models and their attendant assumptions. We must view borrower's answers to the most relevant credit qualification questions simultaneously in order to evaluate the credit risk and to know what type of credit is affordable, and most appropriate for their needs. The benefits of putting borrowers and their credit transactions in the proper context before attempting to determine creditworthiness, or how much to charge for a particular loan, will be invaluable in understanding the overall risk. A Comprehensive Credit Assessment Framework combines the best of judgment and science to create a holistic picture of borrower risk.

There are several modeling components that can be leveraged to close the gap, namely a data component, a sampling/segmentation component, a model factor component, a model formulation/construction component and a model deployment/operational component. These areas are described in greater detail in a CCAF white paper that we have included with this testimony. In a nutshell, underwriting gap components can be addressed by 1) improvements in methodology, such as requiring that known causal factors are included as opposed to letting the data determine what is included based upon pure statistical correlations in the sample, 2) inclusion of a broader set of information that is input to the models, such as alternative data and insurance, 3) inclusion of more observations that might otherwise be excluded due to missing data and indeterminate loan performance 4) less reliance on assumptions, such as "the past determines the future" or the degree to which non-mainstream consumers seeking credit resemble their mainstream counterparts relative to scorecard factors, and 5) more effective model deployment/operation to continually gather and incorporate information to improve decisions over time, and to eliminate any override processes, which can lead to inconsistency in treatment. Relative to the last point, unlike credit scoring, the system becomes less reliant on the original data sample as time progresses and any changes in borrower qualification rules or ratings are handled within CCAF, not "after-the-fact."

Historical Context for Credit Scoring

A good way to understand the credit environment of today is to understand where we started. Over time, there has been a transition from a more "judgment-based" credit granting system (as the phrase is used in Regulation B, Section 202.2(t)), to what we have today, which is primarily a science-based system.[4] Before the 1960's, consumer loans were made using loan officer experience, with some guiding principles. Common practice was to consider the "5C's of credit", namely Character, Capacity, Capital, Collateral, and Conditions when evaluating a consumer loan request.[5] This approach looked at the ability of the borrower to repay the loan through income (Capacity) and, in the event of any interruption in income, their savings or liquid assets (Capital). It also considered the borrower's character by evaluating indicators of stability, his/her performance in meeting current and past credit obligations, and the liquidation value of any collateral and the borrower's equity share in cases where the loan collateral was the property being financed, e.g. real estate, automobile, boat, etc. Finally, conditions were considered that related to the general economic climate and the terms of the loan agreement, such as loan amount, interest and fees, and repayment schedule. This represented a comprehensive approach that had been validated over a long period of time.

The "judgmental" approach, as then practiced, was not without its shortcomings.[6] Because each loan officer constituted "a system," resulting loan decisions were sometimes inconsistent. The breadth and depth of experience varied by loan officer, and there was always the potential for bias in individual decisions. Indeed, there is anecdotal evidence that some occupational biases

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[4] Regulation B Section 202.2 (t) describes a "judgmental system" of credit evaluation: "Judgmental system of evaluating applicants means any system for evaluating the creditworthiness of an applicant other than an empirically derived, demonstrably and statistically sound, credit scoring system."
[5] For examples of the 5C's see Abrahams & Zhang (2008) pp.185-186
[6] For a list, see Abrahams & Zhang (2008) pp.187

existed by virtue of the 3B's: "Never lend to beauticians, bartenders, or barbers," or the 3P's, "Never lend to preachers, plumbers, or prostitutes."[7]

Credit scoring offered a more objective approach, providing consistency, speed, and quantification of the risk that a borrower might default on the loan. Furthermore, scoring was believed to be more accurate because no one loan officer could possibly have all of the relevant information about the total lending pool to make legitimate predications about which ones were good, and which loans would go bad. It was further asserted that even if the loan officer was given access to the information, he/she would be incapable of taking into account the multitude of factors that might come into play in scorecard development, nor could he/she account for all of the correlations among the variables and causally link the result to loan default outcomes. Scoring models can make large quantitative assessments not possible by humans. With scorecards, you could standardize the criteria by which loans are granted, which made comparisons between borrowers facially more objective. This was invariably felt to demonstrate the superior predictive ability of the scoring model over any particular loan officer's judgment-based decision.

The increase in accuracy was actually attributable to a combination of several factors, including the type of modeling approach, the technological means to create the model, and the available data. In reality, the comparison was between a judgmental model, developed by a human being and based on a limited set of loans, versus a statistical model, developed on a computer and based on all of the loans made by all of the loan officers. Our new approach combines the strengths of the two modeling approaches using a computer and it possesses the ability to include an even greater number of observations while incorporating alternative data, insurance data, and

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[7] Ibid, p.187, Figure 6.3, note (a)

other information that is pertinent to the lending decision. Instead of a scorecard that has fixed factors and fixed point values, our approach consists of an action table comprised of segments that can have actions based on a combination of factors, which can vary by table entry, with different weights. Furthermore, each segment, or table entry, can access predictive models and utilize business rules that can represent any conceivable credit policy before quantifying the risk and rendering a decision. Due to its flexibility and degree of sophistication, the system can provide thorough and concise supporting reasons for any loan decision, per Regulation B.

Early-on, scorecard developers found that correlations made it unnecessary to consider more than 7-10 factors and it was determined that the presence or absence of particular factors having perhaps a more explanatory relationship with loan default was irrelevant. In the 1970's applicant income was eliminated from most scorecards because it was inflation-bound so that specific income ranges would quickly become out of date, thus requiring the scorecard to lose effectiveness. Scorecard developers found that dropping income from the scorecard did not have significant impact because of the fact that it was highly correlated with other factors they could include. It was also reasoned, and empirically verified, that wealthy people do not pay their bills on time and hence scorecard bad loan development samples included delinquent borrowers possessing strong capital, irrespective of whether or not they actually ever defaulted on a loan. As a direct result of the inclusion of delinquent payers in the sample with defaulters, the finding that wealth is not predictive has to fall in the self-fulfilling category rather than be categorized as a surprising result. We assert that if non-defaulters are excluded from the bad loan sample, then factors that measure borrower capital and capacity will reflect higher information values.

There is no dispute that credit scoring models work. They do a great job of what they set out to do, namely classifying historical samples of credit applicants with known performance into good and bad groups. However, if we step back a bit and broaden the object of the exercise to revisit the basic question of "Who is creditworthy and who is not?" then we must ask ourselves the question "Based on what?" So far, the resounding answer has been "Whatever is in your credit file," and also "Whatever is not in your credit file." So, we must ask ourselves if creditworthiness should depend on how often we seek credit. Why should seeking credit (i.e. number of credit inquiries) cause greater risk? A model may indicate so. The problem is that with any observed phenomenon there are always plenty of supporting theories that can be posed. But theories are theories, and when we are trying to convince ourselves that a model is correct, then theory can become all too compelling. If consumers make other choices, such as not using installment credit to finance purchase of cars or major appliances, does that, or should that, affect their credit standing? Suppose they do use installment credit, but if they do not respond to credit card offers that fill their mailbox so that the ratio of their revolving to installment credit is within an expected range of, say, six to one, does that mean they are any less creditworthy?[8] An obvious question for consumers is how can they know what impact any particular choice they make will have, e.g. to open, or not open, or close, or not close a credit account, or apply for a loan, or moving their residence, or changing jobs, and so on.[9] The point is that an individual's credit worthiness should depend upon their ability and willingness to repay an obligation. Suppose consumers could know

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[8] I have heard it rationalized that consumers who do have a lower revolving to installment ratio are people who do not get a lot of offers in the first place. The fact that they are not on the pre-screen mailing lists may be viewed as a signal that they do not meet the pre-screening criteria and therefore are probably higher risks.

[9] Common practice is to penalize mortgage applicants if they have been less than 24 months on their job. This is another example of a case where, despite data that indicates the longer someone is at their job, the lower their credit risk. It makes intuitive sense. The problem is that other relevant facts are missing, such as the circumstances of the job move. Was it to take a better job for more money, versus a layoff? Are we saying the people who get promoted are higher risk because they are grouped in with their statistical counterparts? Variables in a model may lack valuable context.

exactly how points are assigned to come up with their credit score. Are we to tell consumers that being responsible in their financial affairs means that they need to modify their behavior so as to maximize their credit score?

In the beginning, we had guiding principles in lending that related creditworthiness directly to the borrower's ability to repay the loan. Then science came along, and we determined that our models could find suitable substitutes for common sense. The CCAF approach seeks to revisit that fork in the road, and retain the guiding principles, while incorporating comprehensive information, including alternative data, and the best that science has to offer.

The Comprehensive Credit Assessment Framework, CCAF

The basic idea of CCAF is to first ensure a comprehensive view of the lending decision with respect to the broadest primary factors that are pertinent to any credit granting. For that exercise, we did not have to "reinvent the wheel" known as the five C's of credit, namely character, capacity, capital, collateral, and conditions. Each of the primary factors are comprised of several rating categories that are generically termed, such as strong, moderate, weak, or poor. A loan applicant is rated according to objective criteria, for example for capacity the borrower's debt ratio and other factors would be taken into account. The character, capacity, and capital factors relate to the borrower, while the collateral and conditions factors relate to the specifics of the loan transaction. Once the borrower is classified by the primary factors, they are assigned a segment number and that number can easily be deciphered to reveal exactly where they stand relative to primary qualifications. Depending upon the borrower's primary givens, secondary

factors or policy rules may be brought into play to render a final decision. Just like credit scoring

models, CCAF is validated to ensure model accuracy is achieved and maintained. Moreover,

because CCAF's primary elements are explanatory in nature, a deeper qualitative validation is

possible and performed, and because it is adaptive in nature, it becomes more predictive over time

and does not need to be replaced at regular intervals.

A system that integrates the best from sound credit principles *and* statistical modeling is

ideal for today's credit environment for several reasons. It creates a better, more complete and

comprehensive view of risk for borrowers, lenders, and regulators because it includes more data,

and it guards against over-reliance on pure statistical correlations or incomplete models and data.

An integrated approach can also allow for a flexible, robust system that can accurately evaluate the

risk of borrowers, regardless of the depth of their credit history, providing them the appropriate

access to credit at appropriate rates. Most important, an integrated approach affords better control

of the models and can provide more stringent qualitative and quantitative-based safeguards for the

credit granting process. Existing credit scoring models can be incorporated in this framework, and

indeed a scoring approach to rate borrowers by the primary factors used to categorize credit

applicants may result in far more credit scoring models than are in use today. In any particular

implementation, the degree to which scoring is used will depend upon what the data indicates, and

other considerations.

CCAF represents a comprehensive and integrated approach for credit granting. More

information used in an effective manner can improve credit risk management and increase

transparency. Credit granting is a multi-dimensional problem, and it demands a multi-dimensional

solution. When structural changes occur in the incoming loan applicant population relative to several primary credit factors, CCAF can provide deep understanding of the root causes. Acceptance rates and loan originations can be tracked relative to any factor, or combination of factors. Positive and negative variances relative to originations, declines, and loan defaults can be effectively examined and better understood.   CCAF represents a common sense approach to understanding borrower-level credit risk that can also help foster understanding of institutional credit risk when viewed in the aggregate.

CCAF also is flexible in its loan approval process because loan applicants that require further action based on their primary classification are evaluated based on their segment, and not the general population. That means that the secondary factors appropriate for one set of borrowers is not necessarily sufficient for others. Furthermore, even if the secondary factors are identical for different segments of borrowers, they can have completely different weights. Moreover, CCAF is not restricted to variables and formulas – it can also use business rules in the loan decisioning process. In this way the system can be updated by changing rating thresholds, by modifying secondary factor thresholds, by introducing or eliminating secondary factors, and by modifying or adding business rules at the consumer segment level. The longer the system is in place the more it can evolve to meet important credit qualification considerations for borrowers. Credit scoring models do not possess this flexibility, as the factors are fixed and the factor weights are also fixed. However, credit scoring models can be applied at the segment level to address combinations of segments that require additional risk evaluation. In this way, CCAF not only enforces credit policy – it can help shape it as results are compiled. Hence, CCAF constitutes both a risk evaluation and a policy formulation system.

<u>Strengths of the CCAF</u>

As just described, the CCAF differs from traditional credit scoring in that it categorizes borrowers according to all primary underwriting factors. These factors generally are derived from key risk indicators, such as debt ratio and loan to value ratio, and are also derived from business rules that examine multiple items that measure such things as capital strength and liquidity. The resulting categorization provides a single number (transaction contour identifier) which immediately provides a picture of the strengths and weaknesses of the borrower relative to the primary qualification criteria. Then, a rating scale is used to describe the overall credit rating when all relevant factors are combined. The scale is based on the observed performance in each borrower categorization. The importance of categorizing borrowers before attempting to risk rate them on pieces of the framework, such as payment history, is that the resulting odds quote is then implicitly based on an "average" over all other factor groups not considered, and so it represents a probability of default, or score, that is "out of context." The result is either an understatement, or overstatement, of the true credit risk, which is bad both for the lender who is trying to price the risk and help the consumer select an affordable loan, and also to the consumer who may either end up over-charged or approved for a loan that could put them at risk of default.

The power of the CCAF is in its ability to look at the 5 C's of credit in context with one another, a method that is not currently used with credit scoring. One must understand a borrower's current financial position and, especially for mortgages, future market conditions to understand his or her comprehensive risk profile. Consider the simple case where we define strong, moderate,

and low capacity based on a ratings associated with a financial obligation ratio and borrower

savings ratio, defined as their monthly savings amount divided by their monthly income. The

savings ratio categories in this hypothetical example are none, low (less than 3%), moderate

(3-7%), and high (8% or more). Suppose we are dealing only with credit payments so we use a

debt ratio that we categorize as low (for values under 30%), moderate (for values 31-45%), and

high (for values greater than 46%).

Case	Debt Ratio	Savings Rate	Capacity Rating
1	L	None	Moderate
2	L	Low	Strong
3	L	Mod	Strong
4	L	High	Strong
5	M	None	Low
6	M	Low	Moderate
7	M	Mod	Moderate
8	M	High	Strong
9	H	None	Low
10	H	Low	Low
11	H	Mod	Low
12	H	High	Moderate

Figure 1.Capacity Rating

If a consumer had a debt ratio of 34% and had a savings rate of 6%, he/she would be

classified in case 7 and would be rated as a moderate capacity risk, as shown in figure 1 above.

From a consumer literacy standpoint, this type of model would not only encourage savings, but

would provide useful information to consumers on how the rate of savings can impact their

classification.

Similarly for capital, suppose we were to simply adopt the ratio of liquid assets divided by

after-tax monthly income, ignoring savings. Suppose we define the rating categories for capital as

follows: Low (less than 3 months), Moderate (4-6 months), Strong (7-23 months), and Excellent (24 months or more). If a consumer had $15,000 in liquid assets and an after-tax monthly income of $3,000, then the months of reserves would be 5 and they would fall into the moderate capital category.

The following hypothetical examples contrast how a couple of different consumers would be evaluated based on a bureau credit score versus CCAF based on just the first 3 C's of Credit.

Example #1: Let's take a borrower who is a well-established revolving credit user primarily for the rewards benefit, pays his credit off monthly, and possesses very strong capacity and ample liquid capital reserves. This consumer pays cash rather than installment credit to purchase automobiles and home appliances, which will lower his credit score. The CCAF would categorize this person and rate them based on their strong capacity and liquid capital. Lack of installment debt would be irrelevant to CCAF. If alternative data were included with full file positive information, the outcome would be surely be a loan, and accompanying rate that is commensurate with the total risk picture of the borrower.

Aside from the issue raised by this borrower, there are other issues. For example, some borrowers in a better financial position, generally speaking, may risk delinquency in their credit payments because the late fees that might be charged are not viewed as a deterrent. The delinquencies could also lead to a lower credit score under traditional credit scoring methodologies despite the borrower's capacity to repay. Because the lowered credit score may over-penalize the borrower, with credit score-driven risk-based pricing, this consumer may pay more for their

financing than is necessary or reasonable given their total risk picture. Also, borrowers who experience hardship, but eventually pay their debts, have to suffer for two years or more with a blemished credit history when that history may represent no additional risk to a creditor. The CCAF would treat such a borrower quite differently. A borrower in a strong financial position would be viewed not solely on their delinquencies in isolation, but on their *overall* financial position, taking into consideration their income (capacity) or their capital (savings). This borrower's delinquency patterns do not pose the same risk when other factors are considered to put the facts in their proper context. With CCAF, the consumer would experience a quicker improvement in his/her credit standing based on current information.

Example #2: Let's take a borrower with a small amount of capital and a relatively small, but steady, income over several years, with very little existing debt. In this instance, his or her payment history of meeting obligations must play a greater role. Under traditional scoring models, this borrower may not obtain a loan, or may have to pay a high interest rate. This conclusion is consistent with the Federal Reserve Board's recent report to Congress on credit scoring, which noted that recent immigrants and young people were assigned lower scores by the models they developed than is appropriate, given the actual performance of these groups.[10] CCAF, on the other hand, would evaluate this borrower more holistically, so that the lack of credit usage would be given less weight.

For loans secured by real property or financial assets (like a mortgage, where the house is the collateral), the 4th C of Credit comes into play. For purposes of simple illustration, we can

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[10] "Report to Congress on Credit Scoring and Its Effects on the Availability and Affordability of Credit," Board of Governors of the Federal Reserve System, August 2007, p.117

adopt loan-to-value as a measure for collateral (in practice physical properties, appraisal, and other information come into play). Suppose we assign a rating of high (over 90%), moderate (70-90%), and low (less than 70%).

Furthermore, we can examine the 5th C of Credit and we may rate conditions as a measure of borrower vulnerability to changes in economic conditions. CCAF takes into account future possible scenarios that impact capacity relative to changes in payment amount due to rising interest rates, capital relative to principal pay down of the loan that increases equity position in the property, and collateral relative to prevailing housing market conditions.[11] Borrower vulnerability will alert the lender immediately if the consumer is applying for a type of loan product that is not suitable due to future affordability risk, even if that product provides a smaller payment amount in the short run, which in turn improves borrower capacity. Current credit scoring models could possibly incorporate this type of factor, presenting this as an opportunity to use scoring technology to quantify borrower vulnerability.

Alternative Data-A Critical Component

The purpose of the Equal Credit Opportunity Act, or Regulation B, was to promote the availability of credit to all creditworthy applicants without regard to race, color, religion, national

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[11] Two candidate metrics combine to capture this risk in three rating categories – high, moderate, or low. First is future LTV, defined as the ratio of the remaining principal amount to the quantity equal to the current market value of the property minus the standard deviation of the value of the property over the past 5 years. The second metric is a future to current payment ratio. The numerator is equal to a probability-weighted payment amount based on the current payment amount at loan origination, the maximum possible payment amount 5 years into the contract, and the simple average of the two payment amounts; the denominator is the loan payment amount at origination. A business rule rates vulnerability as high, moderate, or low, based upon whether the new payment will exceed the policy debt ration and whether the future LTV exceeds a threshold, e.g. 100%. This takes into account both 1) the impact of a housing bubble which can lower the value of the home and curtail access to capital via cash-out refinancing and 2) the risk of rising interest rates which can dramatically increase loan payments

origin, sex, marital status or age.[12] In principle, borrowers should be able access credit at a risk-appropriate price, regardless of the extent of their credit history, provided they have a track record of acceptable payment on their regular payment obligations. Bill payment history can be substituted in cases where there is a lack of credit history, or it may be used to create a bill payment history that integrates both sets of information.   There are important indicators that can be derived from these data, similar to what is being done successfully by the credit bureaus today for credit data. Most often these data are either unavailable or they are not sourced for inclusion in the loan underwriting process. Examples of alternative data include bill payment data for rent, utilities such as electricity, gas, cable, water, telecommunications, insurance, and so on. Additional examples include deposit-related data that covers savings deposit frequency and amounts, checking and savings account duration and balances, frequency of checks with insufficient funds, and so on. Empirical studies conducted on this type of data have demonstrated that they have predictive value. As such, they could help make credit more accessible to consumers who are presently not in the financial system mainstream, or for those who greatly limit their use of credit, but are nonetheless capable of repaying a loan. Alternative data is now more often being considered by lenders but has not yet become mainstream.

In many instances in today's credit system, consumers are rewarded for being more highly leveraged (i.e. having more debt), and penalized for paying with cash. For example if a consumer having no installment debt has $15,000 of capital and uses most of it to purchase a car and a major appliance, his/her capital position is lowered, but his capacity is unchanged, and his credit bureau score is unaffected. Consider case 2, where the consumer finances the car and major appliance with installment contracts, his/her capital position is unaffected, capacity is lowered due to a

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[12] Regulation B Section 202.1, Authority, Scope and Purpose

higher debt ratio, and his credit bureau score will improve, all else being equal. Clearly there is more credit risk and cost to the consumer in the second case, but the credit score is focused on credit usage, and mix of credit, and it sees a lower credit default risk.

The information value contained in alternative data and community data[13] has made it increasingly apparent that significant ground can, and must, be gained in enhancing the state-of-the-art in consumer and small business lending relative to those segments in particular, and perhaps for all borrowers in general.[14] A recent study by the Brookings Institution Urban Markets Initiative and the Political and Economic Research Council (PERC)[15] found that those outside the credit mainstream have similar risk profiles as those in the mainstream when including nontraditional data in credit assessments. The report also found that using nontraditional data decreases credit risk and increases access to credit for those who are creditworthy.

With greater information, lending decisions become better, with lower rates of delinquencies, less overextension, and an increase in the number of performing loans. This will shore up data gaps in the credit evaluation process, especially relative to payment history for non-credit obligations and borrower capacity.

Alternative data can be readily fed into CCAF's handle structure for the purse of segmentation and modeling. Without changing any model factors for payment history, one can incorporate non-credit trade lines. Consider the following example.

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[13] See www.socialcompact.org for more information.
[14] See Turner, Michael, S. Alyssa Lee, Ann Schnare, Robin Varghese, and Patrick D. Walker. "Give Credit Where Credit Is Due—Increasing Access to Affordable Mainstream Credit Using Alternative Data," Political and Economic Research Council and The Brookings Institution Urban Markets Initiative, ©2006. available:
http://www.brookings.edu/reports/2006/12communitydevelopment_turner.aspx
[15] Ibid.

Suppose the payment history dimension of CCAF consists of three ratings, Good, Fair, and Poor. Further suppose that this rating is based on three factors, namely whether or not the consumer has defaulted on an obligation in the past 5 years, whether they are new (credit file less than 2 years old) or established, and their delinquency record, characterized as mild, moderate, and severe[16]. With this information, one can rate borrower payment history based on the scheme shown in Figure 2 below:

Case	Non-Payment	History	Late Payment	Rating
1	**Defaulter**	**New**	**Mild**	High
2	**Defaulter**	**New**	**Moderate**	High
3	**Defaulter**	**New**	**Severe**	High
4	**Defaulter**	**Established**	**Mild**	Medium
5	**Defaulter**	**Established**	**Moderate**	High
6	**Defaulter**	**Established**	**Severe**	High
7	**Non-Defaulter**	**New**	**Mild**	Low
8	**Non-Defaulter**	**New**	**Moderate**	Medium
9	**Non-Defaulter**	**New**	**Severe**	High
10	**Non-Defaulter**	**Established**	**Mild**	Low
11	**Non-Defaulter**	**Established**	**Moderate**	Low
12	**Non-Defaulter**	**Established**	**Severe**	Medium

Figure 2. Borrower Rating for Payment History

The point here is that even delinquent patterns need to be put within the context of whether the consumer is a defaulter and how long they have been paying their bills. The identical definitions can be used to characterize alternative payment data if we simply modify the definition of defaulter to be service discontinued with a balance, apartment vacated with rent due, etc. In this case a

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[16] In this example mild delinquency would include no delinquency.

lender using CCAF would require simply the segment number (from 1 to 12) for the consumer. It is possible that the typical credit score would be retained for comparative purposes.

As mentioned earlier in my testimony, challenges exist in obtaining alternative data. For example, many public utility companies are concerned with the liability of reporting the information reliably and accurately to the credit bureaus. There are companies like Payment Reporting Builds Credit, where my colleague Michael Nathans is currently able to effectively create a credit history for individuals without a traditional credit history (mortgage, student loans, credit cards) by putting together non-credit payment data[17]. Many people with a little or no credit history can end up with a more representative credit score, and thereafter access to credit and a lower interest rate when this type of information is compiled.

Benefits of CCAF: Transparency, Accessibility, Comprehensibility

Greater transparency for the consumer will enable them to understand how they are rated in primary qualification areas and will provide them with specific thresholds that they need to achieve in order to strengthen their credit standing. This puts control into the hands of the consumer while fostering "good" habits. One issue with a statistical model is the concern that, if divulged, consumers will try to "game the system." On the other hand, depending on the factors in the scorecard, the factors might indicate that the consumer needs to borrow more, or borrow

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[17] Example from Brookings Roundtable on Use of Alternative Data in Credit Scoring, December 2005, presentation by Michael Nathans,PRBC,:Consumer had a FICO Score of 568 and a PRBC Bill Payment Score of 781; Medical issue over 3 years ago caused financial hardship; No late payments in past 36 months; Some slow payments 29+ month s ago; On a $225,000 mortgage the difference in APR is 2.5% based on the score differential; The financial dollar impact by score differential is $5,600/yr or $468/mo in the mortgage payment Since that time, In November 2007, PRBC partnered with Fair Isaac to deliver more comprehensive capabilities with the Fair Isaac Expansion score, which incorporates alternative data.

differently, or follow some pattern that is not in sync with the consumer's particular lifestyle, culture, normal habits, or desire. We should have a credit granting system that encourages safe and sound practices – why encourage people to borrow just so they can create a payment record for credit qualification? Its primary focus must be on the financial position of the borrower, the borrower's history of meeting payment obligations, the borrower's equity stake in collateral secured by the loan, and the borrower's vulnerability to increases in market interest rates and softening of economic sectors that impact collateral values. We envision that the consumer would have access to their segment identifier and their factor ratings, perhaps on their monthly statement, so that they can examine it, verify it, and observe how it changes based on the financial choices they make and as their circumstances change.

CCAF can also deal more effectively with missing data than credit scoring. In many cases, the data may not be required due to the primary factor categorization. CCAF is deployed in two stages. Stage 1 consists of primary factors. Stage two consists of secondary factors and business rules. Depending upon the segment, any particular data items may or may not be required. Observations that are missing data for factors not pertinent to the particular segment in which the record falls can be included with zero impact on the model. If the data is required, CCAF has the capability to apply business rules to compensate in the most appropriate manner.

The CCAF provides consumers with the ability to see their risk picture and the attributes that make up that picture. With an understanding of the attributes, the borrower is empowered to take the steps he or she needs to, to change or improve that picture. It thus fosters financial literacy and it represents a very transparent process for the consumer. Loan portfolio managers,

loan pool securitizers, regulators, economists, policy makers and fair lending compliance officers can all benefit from greater transparency that the CCAF segmentation can provide when aggregated appropriately. Limits can be set to regulate segment concentrations per corporate or secondary market requirements. If industry standards are adopted, then CCAF could provide important new benchmarks and early warning on consumer and portfolio trends. For example, if at a national level we see a perfect storm brewing whereby the borrower segment representing low capital, low capacity, high loan to value, and high vulnerability, then we would not have to wait for the normal early warning barometer, namely delinquencies, to start flashing. Going forward, CCAF would provide lenders and regulators with a multi-dimensional capability to spot concentration risk while it is building, so that risk can be limited. From a loss mitigation standpoint, CCAF may be of use to systematically segment loans that either are, or will be, in trouble and assign them to appropriate workout strategies.

Conclusion

For the benefit of borrowers, institutions, and regulators, as well as the overall economic well-being, a fresh perspective on measuring risk is needed. The approach I have described in this testimony will ultimately prove to afford superior accuracy as data and borrower performance accumulate over time. It will also provide greater transparency for all stakeholders in that it will enable consumers to easily see a broader and more direct impact of their financial choices and habits on their credit standing. The flexibility of this approach will enable the consumer's creditworthiness to be viewed in a deeper and more complete context. As a result, the final loan

decision will have incorporated and weighed only those secondary factors that are relevant for the loan in question.

A comprehensive framework that combines the best that judgment and science have to offer, can greatly enhance existing credit scoring models and underwriting processes, and ensure fair access to credit by promoting transparency and common-sense.

I appreciate the opportunity to be here today to present views on enhancements to the credit system I welcome the opportunity to further contribute to this discussion and would be happy to answer any questions.