

## ANALYSIS

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# Benchmarking Consumer Credit Performance With Bureau Data

## Introduction

Benchmarking is a natural exercise for comparing relative performance. We benchmark the performance of different computers, cars and smartphones to one another as well as students and their teachers. It is natural to extend the benchmarking exercise to consumer credit portfolios.

Why might we want to benchmark a portfolio of credit cards or mortgages? The obvious answer is to put observed performance into context. A 10% default rate may sound high for higher-income borrowers with pristine credit histories, but it may be well below the average for lower-income borrowers who are seeking to rebuild their credit after a foreclosure. Benchmarking provides the quantitative context for understanding when to worry about poor performance and when we might consider expanding credit given superior performance.

# Benchmarking Consumer Credit Performance With Bureau Data

BY CRISTIAN DERITIS

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In a regulatory context, benchmarking is an effective exercise for understanding the risk of a bank or portfolio relative to its peers. A benchmark based on market trends and forecasts provides us with a basis for comparison. Given a projection for how loans are expected to perform based on their characteristics, we can then overlay the realized performance to determine if and to what degree a lender is performing better or worse than its market peers.

Another practical use of benchmark data is to address deficiencies in a lender's own loan performance history. Many firms are challenged with not having enough history or having inconsistent detail to effectively inform their projections. Using a benchmark model based on monthly forecasts of volume and performance by line of business, geography, vintage, and credit score from

leading consumer credit bureaus can help mitigate this issue. By considering forecasts based on a richer database, lenders can improve the predictive power of their own internal models.

The key to any benchmarking exercise is the selection of a comparison group. We want to select a sample that is reasonably close to the reference portfolio without replicating it. Selecting too broad a sample gives us too many factors to which to attribute performance variations; at the other extreme, a sample identical to the one we already have is unlikely to provide us with much insight. The "Goldilocks" benchmark sample controls for just enough of the important factors to allow us to detect significant differences between the reference and comparison samples. The comparison sample should come from a broader pool of loans to overcome the small sample bias that may be inherent in the reference portfolio.

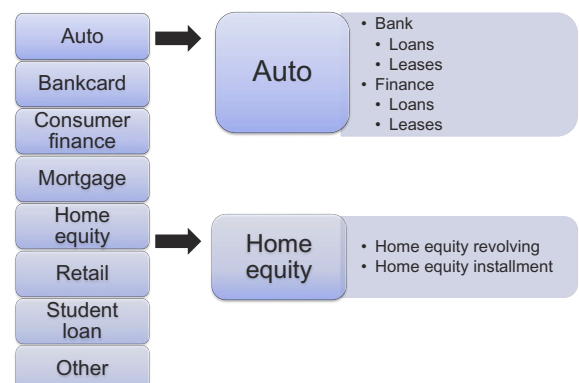
Consumer credit report data are an ideal source for conducting these exercises. They

contain the widest breadth of performance information available—with payment performance on nearly every credit card, mortgage, auto loan, and other consumer credit lines being reported by servicers to the consumer credit bureaus every month.

Through a long-standing partnership with Moody's Analytics, Equifax provides monthly volume and performance information on every account in its database from June 2005 onward.

The data are aggregated by product type (see Chart 1) as well as geography, origination date, and consumer credit score (see Chart 2) to protect the identities of individual consumers and create relevant benchmark cohorts. This provides a complete view of the consumer credit market broken down to a

**Chart 1: Product Categories in CreditForecast**



Source: Moody's Analytics

### Chart 2: Fully Interacted Segmentation



Source: Moody's Analytics

### Chart 3: Granular Data Highlight Differences

30-day+ delinquency rate for 2007Q1 originations, % of \$



Sources: Equifax, Moody's Analytics

fine degree of granularity. For example, using these data we can examine the delinquency performance of bank credit cards issued in the first quarter of 2007 to individuals with a credit score of 620 to 659 living in the Philadelphia metropolitan area (see Chart 3) compared with the nation as a whole. By linking these credit performance and origination quality metrics with underlying local economic drivers, Moody's Analytics has produced econometric models and forecasts of monthly volume and performance by line of business, geography, vintage, and credit score quality. As the models are linked directly to the state of the economy, projections of new loan origination are made available for the purposes of business planning and pre-provision net revenue calculations.

#### Motivation

As a motivating example, consider the case of a bank in the Southeast with a port-

folio of home equity lines of credit issued to consumers across the country. As it is a national portfolio, we may be led to believe that the diversification may be sufficient to mimic aggregate national performance. However, a quick comparison of the distribution of HELOC balances across the country (see Chart 4) with the bank's own portfolio (see Chart 5) reveals high concentrations closer to bank headquarters.

Although the differences in the relative weights may appear to be small, even a relatively small difference can have an impact on overall performance given the disparity in delinquency rates across states, ranging from 1.3% in North Dakota to 3.3% in Mississippi.

This difference alone suggests the need to control for geography in comparing performance. The variation in unemployment rates across geographies shows the need for a narrower analysis as shown in Chart

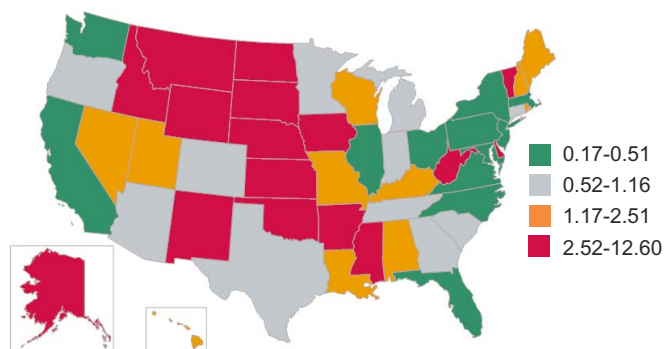
6. In an extreme case, a portfolio concentrated in El Centro CA will be expected to have significantly worse performance than one concentrated in Lincoln NE given local economic conditions.

Controlling for geographic footprint can already explain some of the gap between the national and portfolio-level performances (see Chart 7). But it is not enough. Digging deeper into the data we observe differences between the distribution of credit scores in the bank's portfolio and the national average. Specifically we find that the bank portfolio is more heavily weighted toward lower credit score borrowers than the market average even after controlling for geography.

Once we control for credit score as well as account for age and geography we find that the portfolio actually has outperformed its market peers considerably (see Chart 8). Instead of fearing the performance of this

### Chart 4: U.S. Balances Track Population

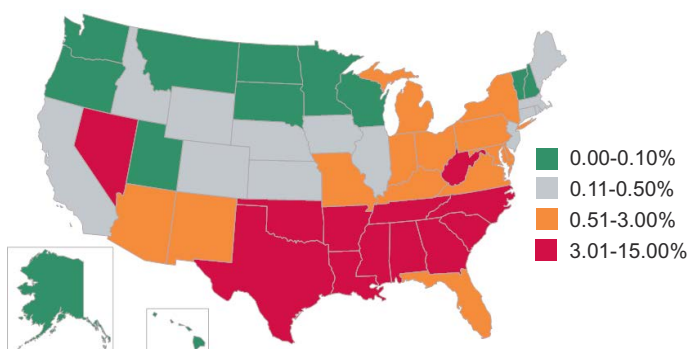
Distribution of HELOC balances by state, % of total \$



Sources: Equifax, Moody's Analytics

### Chart 5: Example of a Concentrated Portfolio

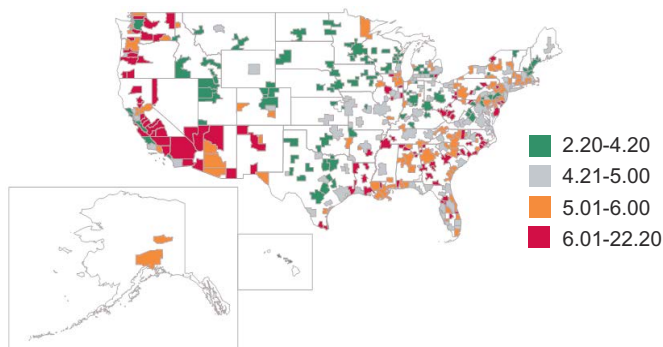
Distribution of portfolio balances by state, % of total \$



Source: Moody's Analytics

### Chart 6: Unemployment Rates Vary Widely

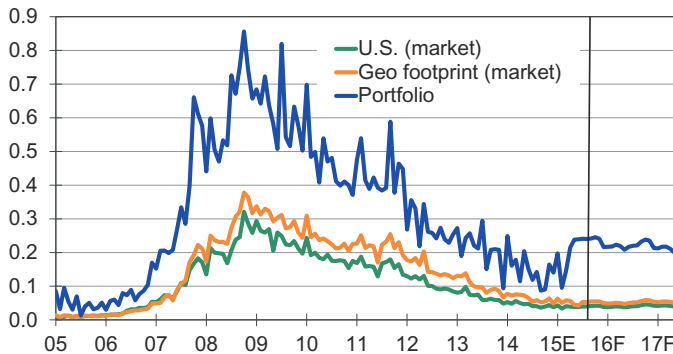
Unemployment rate by MSA, %



Sources: BLS, Moody's Analytics

### Chart 7: Portfolio Performance Looks Bad...

Conditional loss rates for HELOCs, % of balance



Source: Moody's Analytics

portfolio, it actually represents a case study in best practices.

#### Beyond history

Comparing realized performance is informative, but even more beneficial may be an understanding of relative future performance. Projections of loan performance under varying economic scenarios can reveal key risks and sensitivities that a portfolio manager or credit officer may want to address and prepare for in advance of their occurrence—and a regulatory exam.

The Moody's Analytics econometric models of loan volume growth and performance based on the historical market-level data provided by Equifax consider a variety of factors, including loan age, credit score, and geography-specific economic drivers such as house prices and the local unemployment rate for forecasting each of the product-vintage-geography-credit score

cohorts. In addition, models have been developed to forecast origination volumes and outstanding balances by tying historical growth trends to economic indicators such as lending standards, output, interest rates and employment. As a result, it is possible to generate forecasts under varying economic conditions for both an existing portfolio and a hypothetical set of new originations.

The models lend themselves naturally to the benchmarking exercise, as they are built on a large, robust set of historical data and capture market-level trends and correlations as a result.

Using information on the outstanding number and dollar volume of loans in each product-vintage-geography-credit score cohort, these models are able to produce forecasts that reflect expected performance within the portfolio's customized footprint. In other words, these models answer the question: "What would be the expected per-

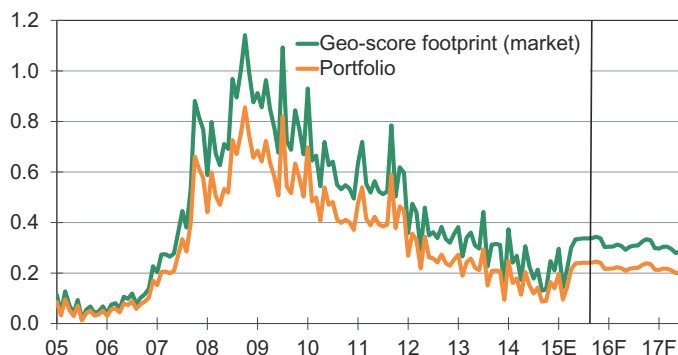
formance of a group of loans under a given economic scenario if they were to perform just like all other loans in their footprint?"

Results from our example are presented in Chart 9. Using the Moody's CreditCycle™ platform, we can quickly generate forecasts under a variety of economic scenarios for an existing portfolio. The economic scenarios may include those generated by Moody's Analytics on a monthly basis (for example, Baseline, Upside Scenario 1, Downside Scenario 2, etc.), regulatory scenarios released by agencies such as the Federal Reserve under its Comprehensive Capital Analysis and Review/Dodd-Frank Annual Stress-Testing program, or custom idiosyncratic scenarios Moody's Analytics has developed in collaboration with its clients.

In addition, users have the option to generate forecasts under their own economic scenario assumptions by either inputting them directly into the Moody's CreditCycle™

### Chart 8: ...But Is Better Than Its Peers

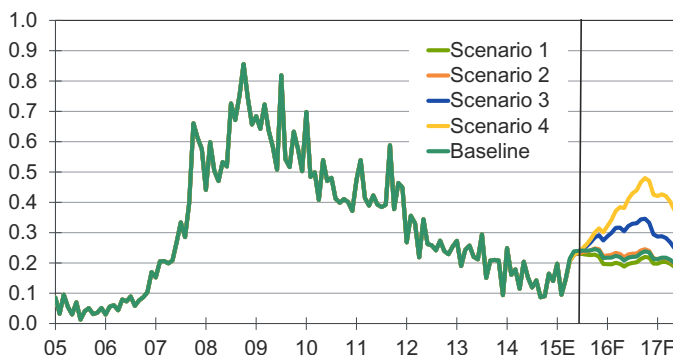
Conditional loss rates for HELOCs, % of balance, annualized



Source: Moody's Analytics

### Chart 9: Forecasting Under Different Scenarios

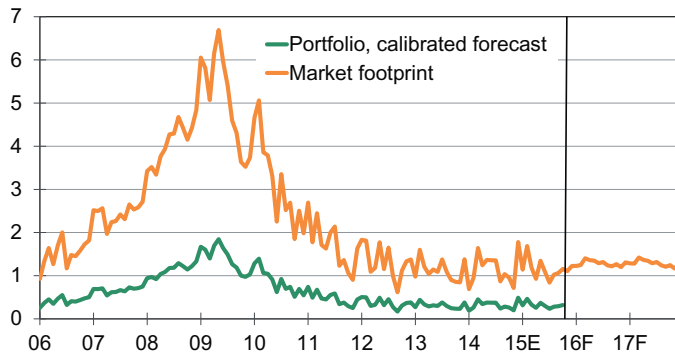
Conditional loss rates for HELOCs, % of balance, annualized



Source: Moody's Analytics

### Chart 10: Addressing Portfolio Differences...

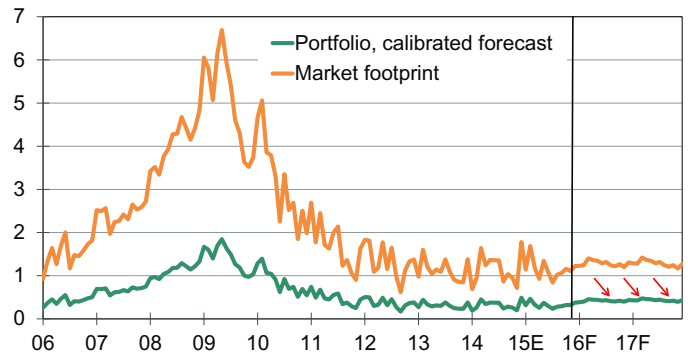
Conditional loss rates for bankcard, % of balance, annualized



Source: Moody's Analytics

### Chart 11: ...Through Forecast Calibration

Conditional loss rates for bankcard, % of balance, annualized



Source: Moody's Analytics

interface or through the Moody's Analytics Economic Model platform. Analysts can enter assumptions around expected originations, including volume by geographic location and credit score band, if they would like the forecast to consider the future performance of these loans in addition to the existing book.

For example, we may assume that origination volumes will increase by 10% in the first year of the forecast with the same distribution of credit scores and geographies observed in the prior year. Alternatively, a risk manager may input a lender's production targets to assess what impact that would have on the projected performance of the portfolio in both the short and long term.

#### Idiosyncratic differences

Forecasting benchmark performance based on total market trends is informative and provides useful context. However, in some cases we may wish to consider explicitly the idiosyncratic differences within a portfolio or a lender.

If a servicer has been particularly adept in reducing default rates by calling borrowers early and often, we may want to develop a benchmark projection that assumes that this favorable trend will continue into the future. Conversely, a risk analyst or investor may wish to assume that a servicer that has consistently underperformed the market will continue to do so in the future.

This is analogous to the Beta concept used by stock market analysts in assessing

the price per share movements of an individual stock. A Beta value of 1 is indicative of portfolio performance that is in line with the broader market. A value less than 1 indicates better performance while a value above 1 is worse.

Chart 10 provides an example of a portfolio of bank credit cards that has consistently outperformed its market benchmark (controlling for origination vintage, geography and credit score distribution). Given these data, we can compare the historical performance to realized history within the same footprint to calculate adjustment factors for our benchmark forecast.

One approach might estimate the intercept ( $\alpha$ ) and slope ( $\beta$ ) differences in the relationship between the individual portfolio and the market through a regression analysis for each geography-origination vintage-credit score combination:

$$\text{Portfolio Default Rate} = \alpha + \beta * \text{Industry Default Rate} + \epsilon$$

By applying the estimated parameters to our benchmark forecast we can generate a calibrated view of the future (see Chart 11).

For smaller portfolios with limited performance history, this can provide a quick and easy loss-forecasting and stress-testing tool for risk managers. This process takes advantage of the rich, robust market data to estimate the relationship between economic variables and market performance while leveraging portfolio-specific information.

For larger portfolios, the results from this simple benchmarking exercise can be

compared with a customized champion model to provide a point of reference. If forecasts between these models should differ substantially, it could point to issues with model specification or may be attributable to other factors.

#### Other benchmark applications

While benchmarking has been largely focused on risk management, it is increasingly being used to identify areas of opportunity or expansion. Broader market data can help lenders overcome the myopia due to focusing on performance within their own portfolios. Lenders looking to expand into new products, new geographies, or new parts of the credit spectrum can leverage historical market data and forecasts to develop their expectations for future performance before making strategic investments.

Benchmarking exercises are beneficial for investors and institutions looking to acquire individual portfolios or banks. The amount of data provided to potential buyers is often limited to a snapshot of the volume of loans within a given portfolio or institution. It is not uncommon for investors to be given a limited number of hours or days to place a bid for assets.

Here too benchmark models can be extremely useful in providing a quick turnaround. Investors can feed the provided data through benchmark models to come up with a quick estimate of expected performance as they look to put together a bid. Large deviations between expected and realized performance may be red flags

indicating deeper issues in underwriting or servicing that an acquirer will want to take into consideration.

### **Benchmarking the future**

Benchmarking continues to evolve and expand as enhanced data become available. While the results from any benchmarking analysis need to be examined in context, market data and performance trends can

help risk managers to concentrate on anomalies and identify opportunities for growth or expansion.

Traditionally benchmarking has focused on comparisons with historical or current performance. With the advent of large-scale, historical databases such as CreditForecast.com, it is now possible to create robust forecasting models of industry-wide performance.

Comparisons of internal projections to market-level forecasts can provide new insights and identify potential risks well in advance of their fruition. By incorporating forecasts into their lending strategies and origination processes, banks and other lenders are better positioned to manage the risks in their portfolio at the best possible time: before loans are either originated or acquired.

## About the Author

Cristian de Ritis is a senior director at Moody's Analytics. He performs consumer credit modeling and analysis with the firm's Credit Analytics group and contributes to the analysis for CreditForecast.com. Before joining the Moody's Analytics West Chester PA operation, Cris worked for Fannie Mae and taught at Johns Hopkins University in Washington DC. He received a PhD and MA in economics from Johns Hopkins University and graduated summa cum laude from Michigan State University with a bachelor's degree in economics.



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