

Controlling Risk in Mortgage Originations Using VantageScore

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VANTAGESCORE.

The New Standard in Credit Scoring

EXECUTIVE SUMMARY

Consumer credit scores play an integral role in identifying consumer risk in many industries, including the mortgage industry. In times such as these of considerable economic volatility, accurate credit scores that are effectively deployed within fiscally prudent origination and consumer loan origination strategies are essential for the health of the mortgage business within any financial institution.

VantageScore is a patent-pending credit risk score developed in 2005, implemented in 2006, and revalidated for accuracy in the changing consumer credit environments of 2007 and 2008. Its architecture reflects a comprehensive understanding of today's diverse mortgage products and consumer behaviors. The score utilizes mathematical techniques, data design and segmentation methods to provide a superior risk assessment tool for the mortgage industry.

This paper provides several analytic insights demonstrating VantageScore's superior risk assessment and resulting positive impact to financials. Specifically, the following results are provided:

- VantageScore provides a superior risk insight for mortgage originations over a five-year window.
- A pro forma P&L simulation shows that a portfolio lender using VantageScore at the point of origination could improve portfolio profitability by as much as \$50 million annually on a \$68 billion portfolio.
- Similarly, VantageScore offers improved risk management for origination strategies designed by region, product or loan size.
- Using VantageScore for non-prime origination strategies can dramatically improve delinquency rates.

INTRODUCTION

The financial services industry has moved much of its mortgage lending strategy from being funded by the available deposits within the specific lending institution to utilizing the bond market where mortgages can be sold to investors, thereby freeing up considerable capital within the lending institution to significantly increase the volume of loans made.

The expanding industry has created two additional results: (1) the creation of many 'exotic' mortgage products whose essential characteristic is an initial period of extremely low fixed amount payments with a reset to a variable, typically higher interest rate payment, and (2) the marketing of these exotic mortgage products to segments of the population that had previously been unable to afford more conventional mortgages, such as 30-year fixed-rate or standard ARMs. Compounding these results, lending practices have become increasingly lax with little to no verified documentation being required in some cases.

The net impact of these results is that subprime mortgages increased from \$65 billion in 1995 to \$449 billion in 2005. Alt-A loans totaled \$366 billion. The combination of these two categories accounted for approximately one third of total mortgage loans in 2006 (Mortgage Banker). The National Association of Realtors reported that nearly 40 percent of first-time homebuyers in 2005 and 2006 put no money down on their homes.

As often happens with most cycles, mortgage market participants who acted imprudently during these years of robust activity have since suffered severe losses or are no longer in business. Mortgage originators that remain have tightened credit criteria and are examining ways of improving the approval process, while at the same time rating agencies and other secondary market players are examining their methodologies.

In light of the desire for new tools in the mortgage market, this paper examines VantageScore® for its predictive ability during volatile economic times.

METHODOLOGY

Several portfolios of originating mortgage loans were scored with both VantageScore and a benchmark score¹ used for performance comparison purposes. The capacity for each score to accurately rank order risk at time of origination, typically defined as 90 days or more past due, was calculated. The accuracy of the rank-ordering capacity was measured using two metrics – default rates by deciles and

Kolmogorov-Smirnov statistics (KS statistics). Default rates results are also translated into a P&L pro forma.

Note: These analyses demonstrate the value to the lender when using VantageScore for loan originations only. Future papers will present the additional value available when VantageScore is also used for mortgage portfolio management.

Data Structure

Two portfolios were created for the analysis:

- 1) A portfolio of 600,000 randomly selected mortgage loans that were originated over the 2000/2001 timeframe were scored with VantageScore® and the comparative benchmark credit score¹. Loan performance (defined as 90 days or more past due, charge-off, bankruptcy and foreclosure) was tracked throughout the following five years. [Data provided by Experian, Oct 2007]
- 2) A second portfolio of another 600,000 randomly selected mortgage loans that were originated between 2003 and 2005. Loan performance was captured two years after origination. [Data provided by Experian, Equifax and TransUnion, Sep 2007]

Primary Evaluation Criteria

Business metrics:

Actual delinquency rates by decile is used as the primary comparative business metric. Delinquency rate is defined as the percentage of consumers in the decile whose mortgage loan is at least 90 days or more past due. Scores identify good performance and assign higher scores to those consumers putting them in the upper decile ranges (1-5), and consumers with a higher propensity to become delinquent will result in lower scores putting them in the lower decile range (6-10).

Statistical metric:

KS values can range from 0 to 100. A value of 100 indicates that the credit score perfectly identifies those consumers who will become delinquent on their loan and those who will remain in good standing – in other words, the credit score is perfectly accurate. A KS value of 0, indicates that the credit score identifies defaulting and good performance with complete randomness.

Evaluation Window

Credit scores are classically designed to indicate the propensity for an account to become 90 days or more past due over a two-year window, based on the perspective that most portfolios mature in their behavior within that time frame. Given the heightened economic volatility of the last 5 years, performance was also measured over an extended window - up to 5 years. This 'stress-testing' of the score provides insight into the capacity of the score to provide long-term insight into the health of a portfolio.

Benchmark Score

The benchmark score¹ was developed in 2000 on a randomly selected U.S. consumer database. The majority of mortgage products available during that timeframe were 30-year fixed rate, 10-, 15- and 20-year adjustable rate mortgages. Conforming loans were defined as a loan less than \$250,000.

P&L Simulation

To examine the business impact by using VantageScore as an alternative decision making tool at origination, a pro forma P&L simulation was developed. Using publicly available financial metrics (annual rate of return of 2.3 percent and an annual loss rate of 1 percent), the simulated profit is calculated based on the selection of higher scored populations by using the benchmark score¹ and VantageScore, respectively. The simulations are developed on the top 60 percent of the portfolio through to 100 percent of the portfolio at 5 percent increments to identify the point of maximum profitability.

Non-Prime Design

A subset of the second portfolio defined above was created consisting of consumers with credit scores that would have resulted in being offered an Alt-A or sub-prime mortgage product. These consumers were identified using the benchmark credit score¹ cut off of 660 or below. The analysis examines the improved accuracy VantageScore® delivers in assessing risk and reduction in default levels for originating loans to the non-prime sector.

Additional Areas of Interest

Rank-ordering capability was assessed along several additional dimensions:

- Region: California, Texas, Florida, Illinois (known areas of heightened mortgage distress)
- Term Length: 30 yr, 15 yr, 10 yr
- Loan Size:
 - Conforming : < \$50k, \$50k-\$100k, \$150k-200k
 - Jumbo: >\$250k

RESULTS

VantageScore® provides a superior risk insight for mortgage originations over a five-year evaluation window.

A portfolio of 600,000 mortgage originations was randomly selected from 2000/2001. The timeframe was selected as the most recent era reflecting similar economic volatility as today's environment. VantageScore's risk assessment capacity was compared against the benchmark credit score¹. Risk assessment capacity was measured both statistically and on a delinquency rate rank-ordering basis. Performance was measured every year after loan origination for five years. Throughout these analyses, VantageScore demonstrated superior risk assessment.

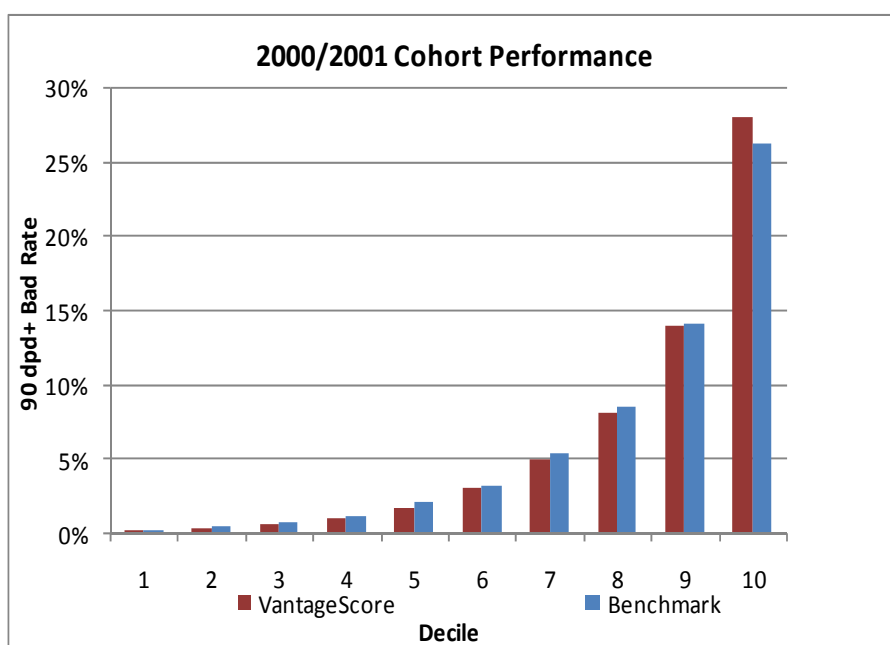
Performance was also measured on a foreclosure basis only. VantageScore similarly outperformed the benchmark score¹ in more accurately assessing risk.

Cumulative Bad Rates			
Decile	VAN	BMK	Diff
1	0.24%	0.33%	0.08%
2	0.32%	0.41%	0.10%
3	0.43%	0.53%	0.09%
4	0.58%	0.70%	0.12%
5	0.83%	0.98%	0.16%
6	1.21%	1.37%	0.15%
7	1.76%	1.95%	0.19%
8	2.55%	2.77%	0.22%
9	3.83%	4.04%	0.21%
10	6.25%	6.25%	0.00%
KS Value	53.60	51.50	

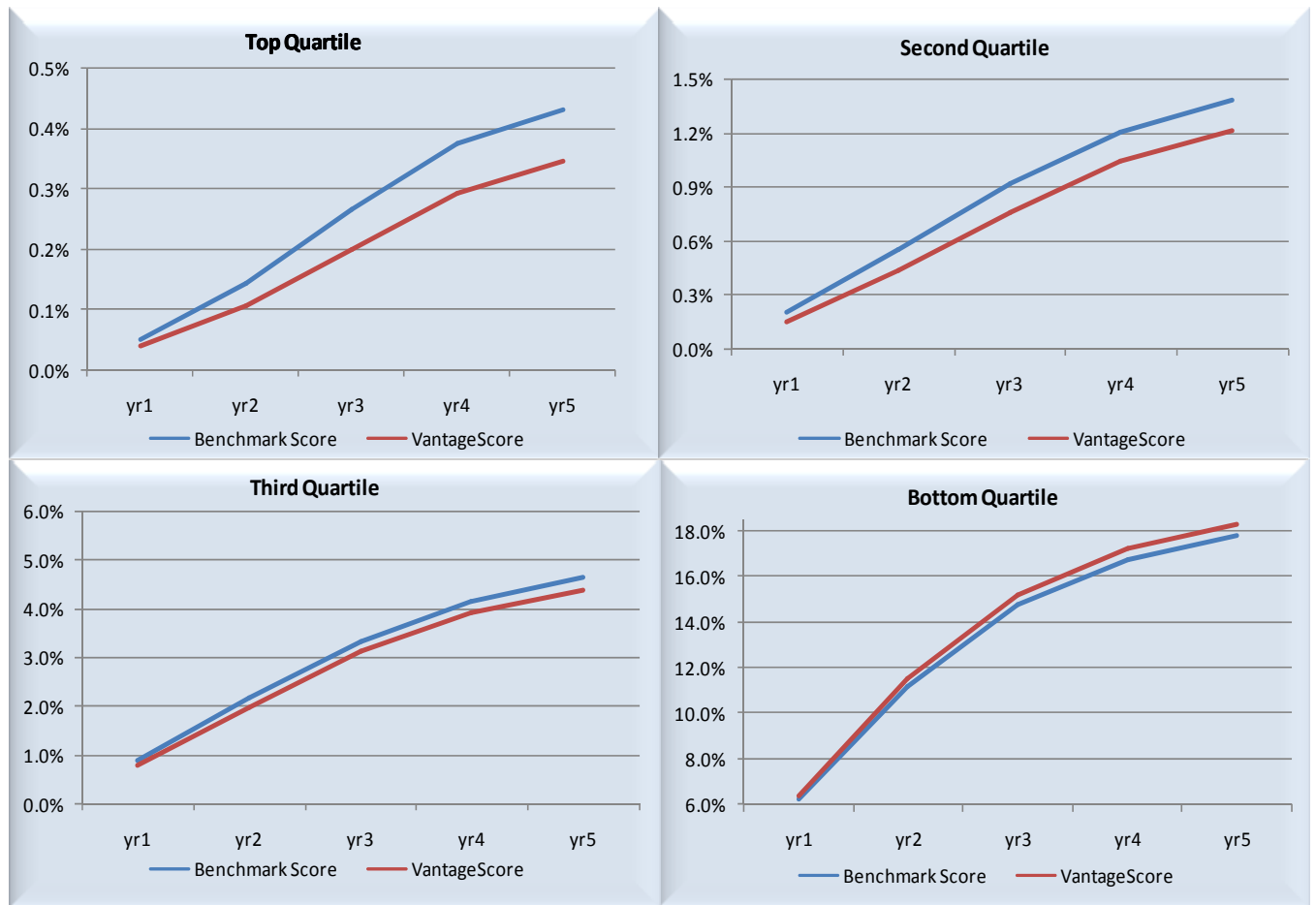
Denotes maximum separation

VAN VantageScore

BMK: Benchmark score

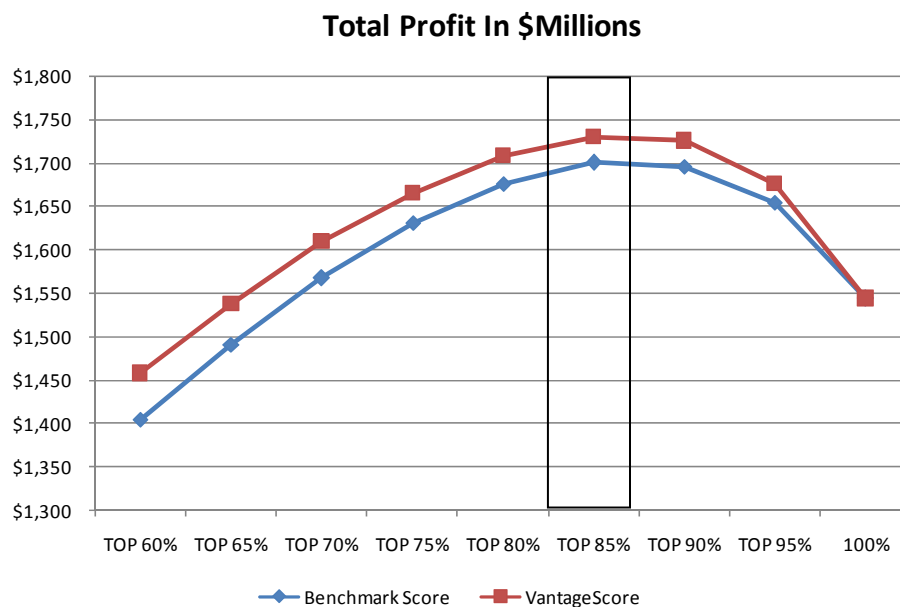


Over the five-year performance window, the top 75 percent of the loans ranked by VantageScore® perform consistently better than the top 75 percent ranked by the benchmark score¹, and the bottom 25 percent ranked by VantageScore has a consistently higher delinquency rate than those ranked by the benchmark score¹.



P&L Pro forma: VantageScore® can deliver as much as an incremental \$50 million annually in portfolio profitability.

Here, a typical pro forma profit and loss simulation is developed for a randomly selected mortgage portfolio that contains mortgage loans that are greater than \$50 thousand in loan size and with mortgage terms that are 15 years or longer. The total number of loans in this portfolio is 450,000, with an average loan size of \$150,000. The total portfolio size is \$68 billion. Assuming an annual rate of return of 2.3 percent, and annual loss rate of 1 percent, the following chart captures the total profits by using the two scores in our study to identify consumers with lower credit risk in the portfolio. For example, if we use the benchmark score¹ to identify the top 60 percent percent of the population, the resulting profit would be \$1.40 billion. This compares to \$1.45 billion in profit resulting from selecting the top 60 percent using VantageScore, an improvement of \$50 million in profit. The greatest profit opportunity for this portfolio is achieved through originating the top 85 percent of accounts with VantageScore.



Underwriting criteria: Increasing approval rate of loan applications

VantageScore® offers improved risk management for origination strategies designed by region, product or loan size

Performance by term length

Cumulative Default Rates						
Decile	30 Year Term		15 Year Term		10 Year Term	
	VAN	BMK	VAN	BMK	VAN	BMK
1	0.30%	0.39%	0.15%	0.17%	0.23%	0.34%
2	0.38%	0.47%	0.17%	0.25%	0.34%	0.40%
3	0.51%	0.61%	0.17%	0.26%	0.36%	0.44%
4	0.69%	0.84%	0.25%	0.32%	0.43%	0.53%
5	0.99%	1.16%	0.32%	0.41%	0.64%	0.75%
6	1.42%	1.60%	0.42%	0.52%	0.97%	1.10%
7	2.01%	2.23%	0.63%	0.71%	1.38%	1.54%
8	2.87%	3.11%	0.97%	1.08%	2.07%	2.13%
9	4.19%	4.43%	1.65%	1.75%	3.00%	3.07%
10	6.69%	6.69%	3.45%	3.45%	4.81%	4.81%
KS Value	52.27	49.99	60.17	58.80	52.71	50.82


 Denotes maximum separation

VAN : VantageScore

BMK : Benchmark score

Performance by loan size

Cumulative Default Rates								
	<=\$50k		\$50k-\$100k		\$150k-\$200k		Jumbo	
Decile	VAN	BMK	VAN	BMK	VAN	BMK	VAN	BMK
1	0.50%	0.59%	0.37%	0.41%	0.24%	0.26%	0.14%	0.12%
2	0.62%	0.74%	0.49%	0.56%	0.27%	0.30%	0.14%	0.20%
3	0.89%	1.03%	0.75%	0.81%	0.32%	0.34%	0.20%	0.22%
4	1.32%	1.49%	1.06%	1.17%	0.38%	0.43%	0.28%	0.29%
5	1.97%	2.12%	1.57%	1.73%	0.50%	0.58%	0.33%	0.35%
6	2.71%	2.92%	2.36%	2.48%	0.74%	0.80%	0.39%	0.40%
7	3.84%	4.04%	3.33%	3.51%	1.00%	1.13%	0.50%	0.55%
8	5.40%	5.54%	4.56%	4.82%	1.44%	1.51%	0.65%	0.74%
9	7.23%	7.52%	6.39%	6.62%	2.08%	2.18%	1.00%	1.08%
10	10.07%	10.07%	9.16%	9.16%	3.65%	3.65%	2.07%	2.07%
KS Value	49.40	48.05	49.68	48.42	52.96	50.35	55.71	52.33


 Denotes maximum separation

VAN : VantageScore

BMK : Benchmark score

Performance by key regions

Cumulative Default Rates								
	California		Florida		Texas		Illinois	
Decile	VAN	BMK	VAN	BMK	VAN	BMK	VAN	BMK
1	0.09%	0.19%	0.27%	0.38%	0.45%	0.65%	0.26%	0.15%
2	0.15%	0.20%	0.33%	0.48%	0.59%	0.73%	0.27%	0.38%
3	0.19%	0.25%	0.40%	0.57%	0.82%	0.99%	0.35%	0.45%
4	0.26%	0.32%	0.62%	0.72%	1.06%	1.31%	0.51%	0.59%
5	0.37%	0.44%	0.89%	1.10%	1.47%	1.71%	0.69%	0.80%
6	0.52%	0.61%	1.35%	1.55%	2.20%	2.32%	0.85%	1.10%
7	0.72%	0.83%	2.01%	2.10%	3.05%	3.24%	1.32%	1.51%
8	1.05%	1.19%	2.77%	2.95%	4.17%	4.49%	2.04%	2.20%
9	1.54%	1.75%	3.94%	4.18%	5.79%	6.09%	3.12%	3.25%
10	2.90%	2.90%	6.39%	6.39%	8.59%	8.59%	5.43%	5.43%
KS Value	54.25	51.66	51.79	50.43	49.32	48.07	55.67	53.51

 Denotes maximum separation

VAN : VantageScore

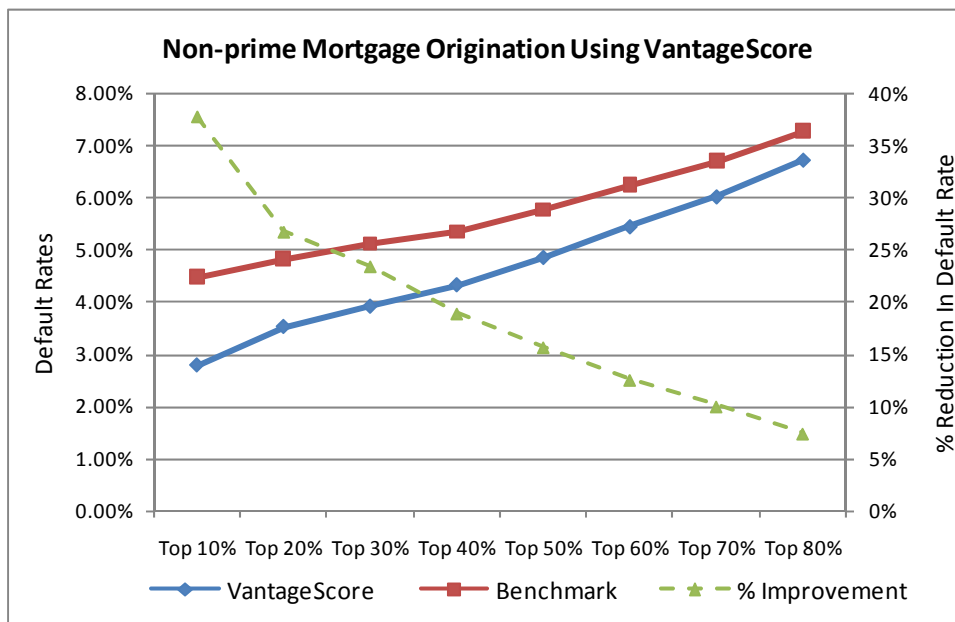
BMK : Benchmark score

Using VantageScore® for non-prime origination strategies can change the portfolio mix and dramatically reduce delinquency rates

Non-Prime Portfolio Design

A subset of the second portfolio defined above was created consisting of consumers with credit scores that would have resulted in being offered an Alt-A or sub-prime mortgage product. These consumers were identified using the benchmark credit score¹ cut off of 660 or below.

The non-prime portfolio was analyzed to determine whether using VantageScore could substantively reduce delinquency rates in this high risk arena. Identifying the top 10 percent of the portfolio with both credit scores resulted in VantageScore identifying a segment of loans with a delinquency rate that is more than 35 percent lower than the segment identified by the benchmark score¹. The top 20 percent of the portfolio identified by VantageScore results in a delinquency rate that is over 25 percent lower than the loans identified by the benchmark score¹. Naturally there is a diminishing return in delinquency lift as loans are originated deeper within the non-prime portfolio.



CONCLUSION

Most, if not all, mortgage market participants are reexamining programs and processes, including credit scores, to avoid a repeat of the issues that contributed to the current crisis faced by the industry. No doubt, credit scores will continue to play a significant role in the qualification of a mortgage applicant. Given the results outlined in this study of strong predictiveness and improved profitability, the mortgage industry should examine the scores currently used within their environments to determine if improvements can be gained.

¹ Experian NES Score