Improved Assessment of Credit Health Using Trended Credit Data

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INTRODUCTION

When a person visits the doctor's office for a checkup, the attending doctor typically measures their height, weight, blood pressure along with some blood work to quickly assess their "current" physical well-being. But it doesn't stop there.

These measures are merely a "snapshot" of a person's health and don't readily imply a lot of understanding of a patient's overall condition. Only when the data is compared against a patient's past history of physicals, does it allow for a more advanced study. Are these measurements moving in the right direction with regards to their health or, are they stressed and in need of additional intervention?

When it comes to monitoring creditworthiness, most credit score models stop at the static measurement - your most recent credit report - to determine a consumer's credit health. Yet, when the data is available, it makes more sense to additionally study the trends in order to build a better understanding of the credit behaviors associated with good versus risky credit health.

VantageScore® 4.0, the fourth model introduced by VantageScore Solutions, utilizes trended credit data. It is currently the only tri-bureau generic credit scoring model to do so.[1] The purpose of this paper is to discuss what trended credit data means in terms of measuring credit behavior and how this data enables a more accurate assessment of risk compared to a traditionally "static" credit view.

1 The white paper "Trended Credit Data Attributes in VantageScore 4.0" from October 2017 is an excellent resource explaining how trended credit data is used in VantageScore 4.0, and can be found at: https://www.vantagescore.com/resource/173/trended-credit-data-attributes-vantagescore-40.

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Executive Summary

This white paper first presents an overview of what trended credit data is on a credit report and what it provides. Second, this paper examines how direct credit management behaviors over time become a stronger indicator of credit risk versus static behavioral snap shots. Finally, a comparative case study using two credit scoring models, one containing only static attributes and the other incorporating trended credit data, highlights how insights drawn from trended credit data improve the view of a consumer's risk profile.

These examinations lead to the following key findings:

- Trended credit data can help track credit management decisions consumers make over time, offering valuable insights to how consumers manage their debt obligations.
- Insights provided by trended credit data provide a deeper understanding of a consumer's credit risk and allows for a more "advanced" credit health assessment compared to use of only current or snapshot data.
- Credit scoring models leveraging trended credit data, such as VantageScore 4.0, provide more accurate risk assessments than those provided by credit scoring models using only static attributes.
- Use of trended credit data in credit scoring models allows more emphasis to be put on a consumer's core credit management behaviors while lessening the weight on the traditional tenure and depth of credit-related information.

TRENDED CREDIT DATA OVERVIEW: CORE CREDIT MANAGEMENT

Recent reporting advances at the credit bureaus (a.k.a. Credit Reporting Companies, or CRCs) have made a trended 24-month credit report history available. This means that in addition to a consumer's most recent balances, credit limits and payments, a history spanning over two years of these elements is also reported, allowing for a more comprehensive evaluation using a consumer's "core credit management" behaviors over time by observing the trends.

These observations provide new clues on how consumers use credit and manage their debts. For credit score modeling, this allows a more "advanced" credit health assessment by evaluating these trends. Not only are the resulting assessments more predictive than those provided by credit scoring models using only static attributes, but they also reduce the weight put on these static attributes in assessing a consumer's creditworthiness. So, what is trended credit data on a credit report?

A lender reports every active trade line for a consumer to a CRC. Each trade line has four components that are updated by the lender each month regarding the status of a trade line: Balance, Credit Limit (or original loan amount for installment loans), Amount Due and Amount Paid. Trended credit data takes these four components for each trade and compiles a 24-month history of the consumer's credit management activity, providing lenders the ability to get a more comprehensive view of the consumer's behaviors in managing debt.

How does trended credit data provide more information than the static "snapshot" view? The following graphs highlight two consumers with trended credit data over a three-month and a 12-month period. The "snapshot" views are the last data points belonging to the month of September.

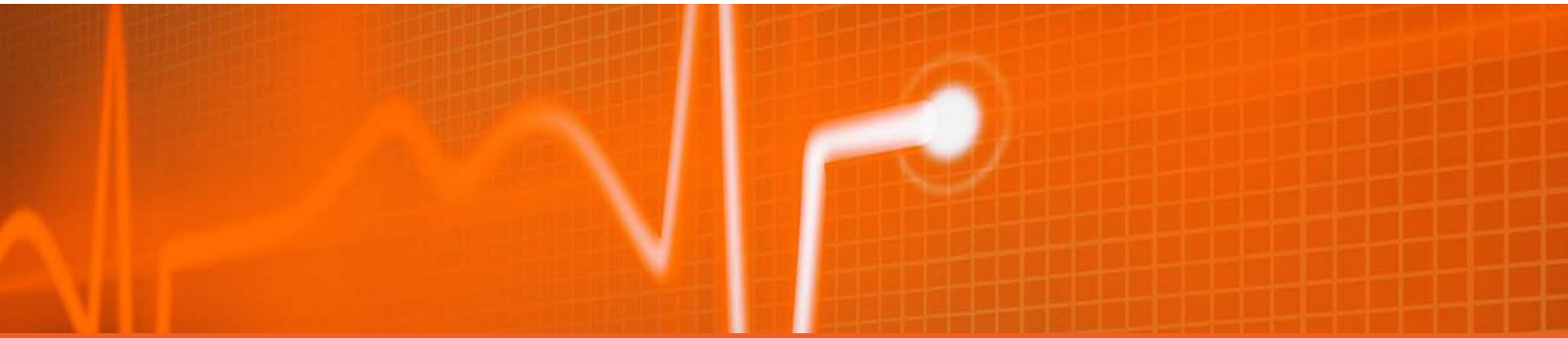


FIGURE 1: Total Balances

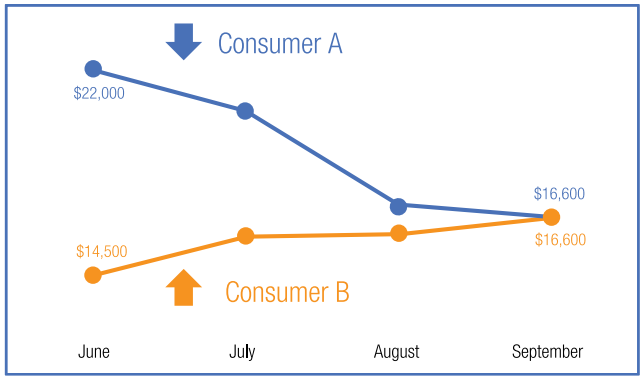


FIGURE 2: Total Utilizations in past 12 months

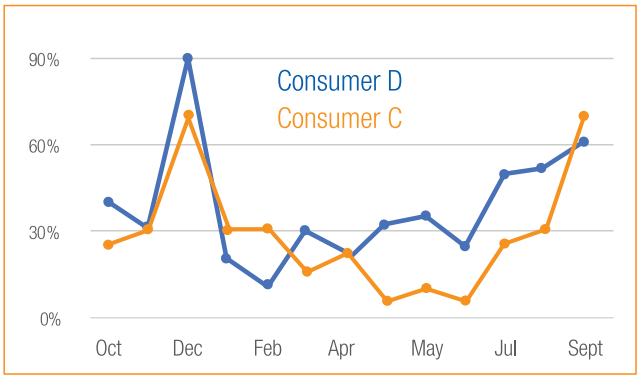


Figure 1 shows the balances for Consumer A and Consumer B for the current month of September, as well as for the prior 3 months. The current "snapshot" indicates that both consumers are at the same level of debt with $16,600 in outstanding balances. The 12-month trended view, on the other hand, shows that these consumers are on very different paths regarding their use of credit. While Consumer A has shown a strong pattern of deleveraging, Consumer B is steadily increasing balance exposure with no evident pay-down pattern.

Figure 2 shows the utilization trends for revolving accounts for two other consumers, Consumer C and Consumer D. Utilization is a calculation that measures the balance a consumer has over their credit limit on revolving accounts such as credit cards. Consumer C is currently at 70% utilization whereas consumer D is lower with 60%. From a static standpoint, Consumer C has higher utilization and, all else equal, would be considered higher risk. Looking at the trended credit data over the past 12 months, we note that Consumer C has shown a similar maximum of 70% in the past but has also shown a significant subsequent drop in utilization, averaging under 30% over the year and demonstrated the ability to pay down high balances. In the past three months, Consumer C's utilization has been well under 30%. Consumer D, on the other hand, has shown a 12-month maximum utilization of 90%, a very high and risky level. Moreover, Consumer D has steadily risen utilization over the previous six months averaging utilization closer to 40% of the overall limit. When all of these points are considered, Consumer D appears to exhibit more risky behavior compared to Consumer C, contrary to what a static-only view would suggest.

HOW IS TRENDED CREDIT DATA MORE PREDICTIVE?

Trended credit data has the ability to identify credit risk behaviors previously unknown to a static view of the consumer, but does that really translate to a better risk assessment? It is instructive first to identify the key elements contained in a credit report and see how they function as risk indicators in a credit scoring model. Broadly speaking there are four major categories of characteristics that are used by a scoring model from a credit report. These are:

- Payment History – How the consumer has paid/or not paid tradelines over time.
- Recency – Inquiries for credit and access to new credit; the number of times the consumer has recently applied for credit and the number of new accounts opened.
- Tenure/ Depth and Breadth of Credit – The consumer's age of credit (e.g., oldest trade, average age of trades, newest trade) and the types of credit the consumer has.
- Credit Management Behaviors – How the consumer has managed debt; utilization, the amount of balances owed, the amounts that have been paid down on installment loans (i.e., auto, mortgage, student, etc.) and the amount of credit available.

While trended data exists in all four categories, for illustrative purposes, it is this fourth category where trended credit data can reveal critical insights for a lending decision.

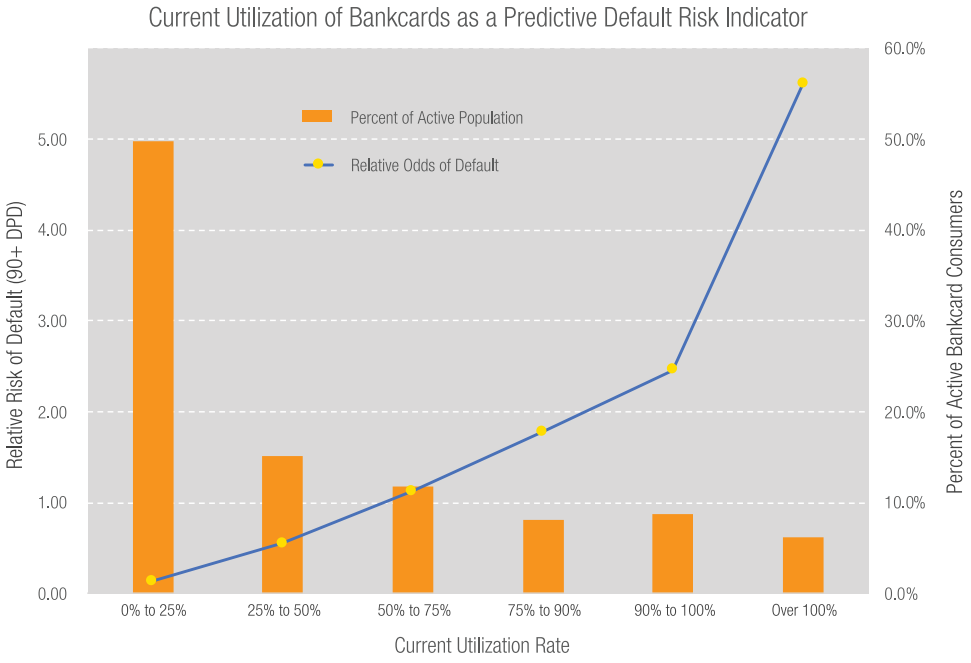
The traditional credit scoring models only use the most recent information on your accounts. Information such as payments made and amounts due cannot be reviewed over time since the payment reflects only the last payment made and the amounts due are reflective of the current balance.

Trended credit data allows comparison of the payment made in a given month to the amount due from the prior month's data. This enables predictive insights to be gathered by identifying whether a consumer is simply "treading water" by making the minimum amounts due, or, actively paying down debts.

To understand how trended credit data enables a more accurate risk profile of the consumer, utilization is also demonstrative. Utilization rate indicates how much of the available credit a consumer has used. A high utilization rate, 90% or more for example, traditionally implies that the consumer is "near the end of the rope" in terms of available credit and is at high risk of going into default.

Figure 3 shows a sample of 700,000 active credit card users and their corresponding risk of default in the subsequent two years on their existing credit card trades based on their most current "snapshot" utilization rate. The graph shows that an active card holder's current utilization rate is a strong predictor of default. Consumers with extreme utilization rates, greater than 100%, have nearly 6 times the chances of defaulting on a trade versus the "average" consumer. About 6% of the total active population exhibit utilization rates this high. Similarly, consumers who have 90% or higher utilization have two times or higher risk compared with the average consumer. In contrast, consumers with utilization rates below 25% default at 1/10 the rate of the "average" consumer. Roughly half of the active bankcard users fall into this low risk category.

FIGURE 3: Static View: Utilization Measuring Risk of Default (90+ DPD)



Trended credit data looks to augment this snapshot by incorporating information on how a consumer has gotten to a certain point. Have low utilization consumers always been stable with their use of credit, or is there volatility in utilization rates over time? Are some consumers continuing to keep high utilization levels or are they de-leveraging and becoming a safer risk?

Figure 4 shows the same consumers in each of the current utilization rate categories combined with their maximum utilization observed over past 12 months, which is indicated by color. This enables the ability to assess which consumers have "maintained" a consistent utilization rate versus those who fluctuate into riskier categories over time. In the lowest risk category, currently less than 25% utilization, only 60% of those consumers have consistently maintained a utilization rate below 25% over the previous 12 months (dark blue bar). The remaining 40% (light blue, grey, yellow, orange and red) have shown some movement to higher utilization rates. Moving to a higher utilization rate categories (on the x-axis), more consumers show a higher propensity to fluctuate to higher risk use of their revolving credit.

FIGURE 4: Distribution of Consumers' Maximum 12-month Utilization Given their Current Utilization

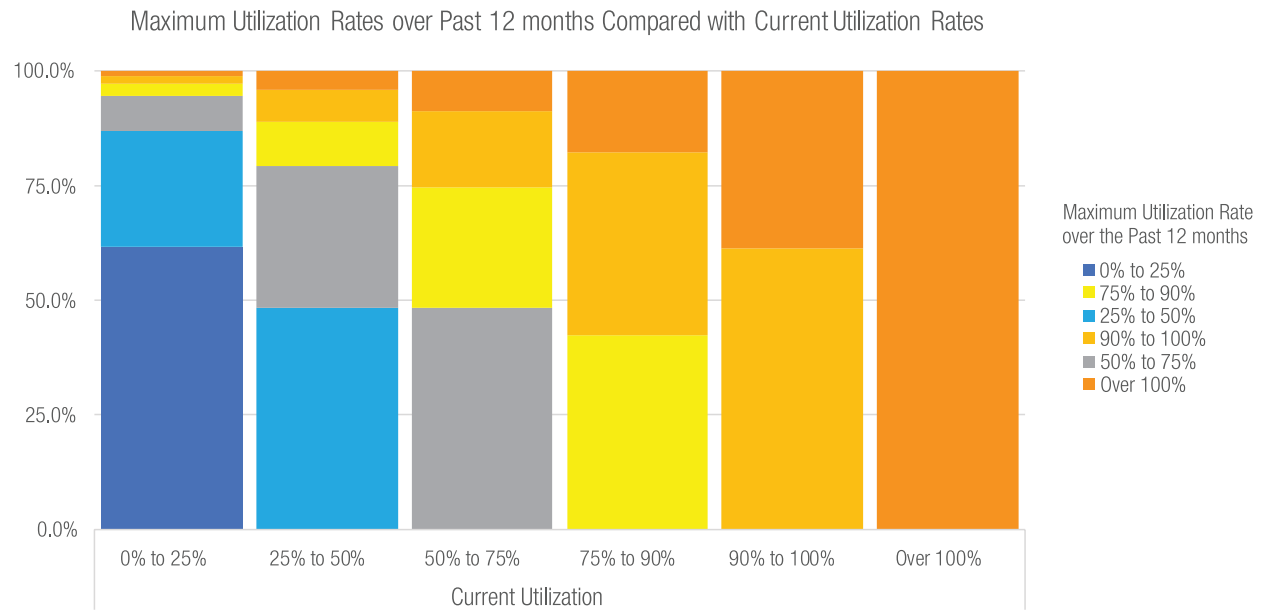
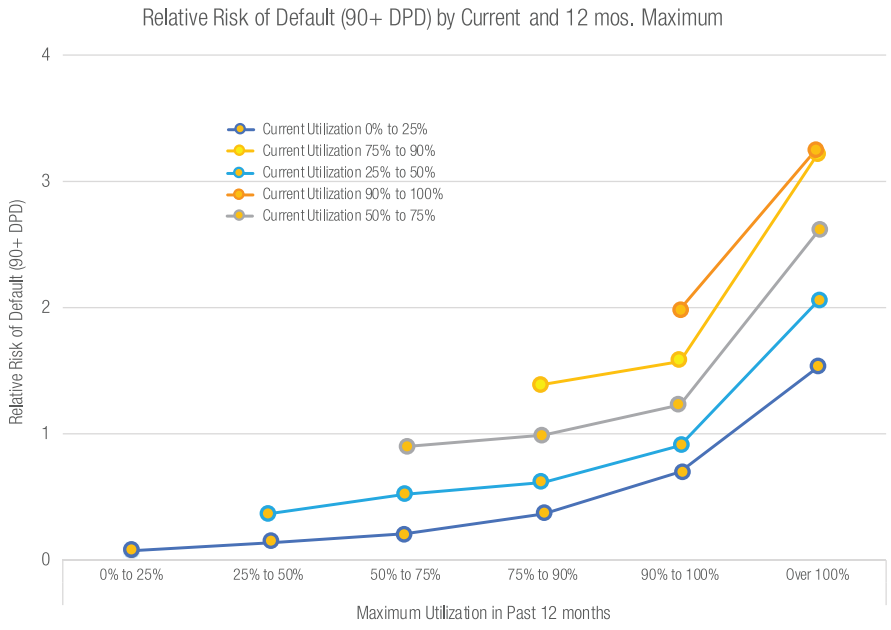


Figure 5 then shows the relative default risks (Y-axis) associated with each current utilization rate category (X-axis) when the maximum utilization rate over the past 12 months is also taken into account. Each line represents how the relative default risk changes for a given current utilization rate category when the 12-month maximum utilization rate is brought into the picture.

It is noteworthy that moving from left to right on the x-axis, as the 12-month maximum utilization rate increases, the relative risk monotonically increases in every current utilization rate category. As an example, while consumers in the lowest utilization category (less than 25%, represented by the dark blue line in the graph) overall have default rates at only 1/10 of the average consumer, default rates are higher for consumers within this category who had higher utilization rates in the past, nearing or exceeding the risk of the average consumer in cases where the 12-month maximum utilization rate was more than 90%.

FIGURE 5: Relative Risk (90+ DPD) of Consumers by Maximum 12-month Utilization Given their Current Utilization



Over 3,000 trended variables were assessed during the development of VantageScore 4.0, allowing the model to bring core credit management characteristics into the forefront in assessment of credit risk, resulting in deeper insights and significant improvements in prediction.

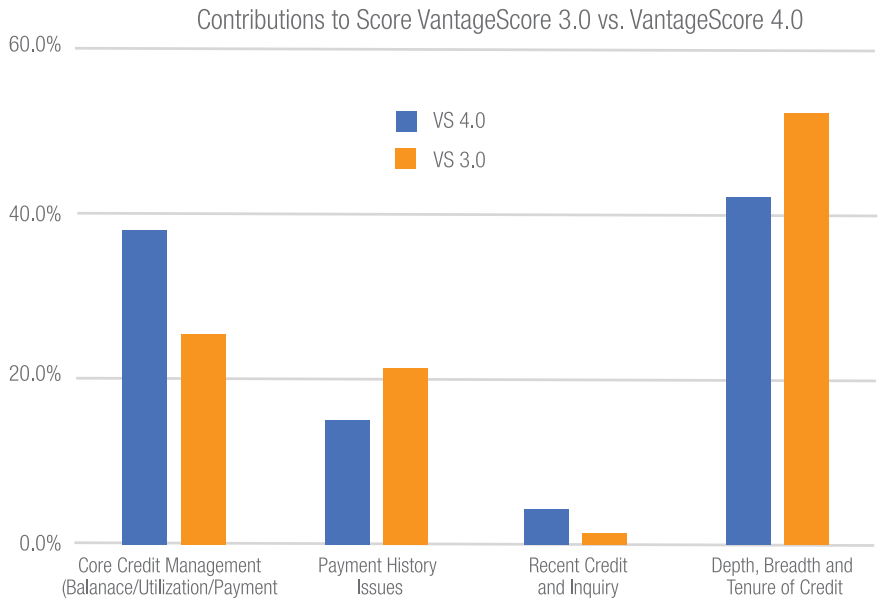
The enhanced understanding of a consumer's credit risk afforded by trended credit data clearly improves upon the initial risk assessment based on the current snapshot alone. Across every "current" utilization rate bucket, incorporating information related to previous stresses, or instability, in a consumer's use of credit provides a much stronger separation when predicting future default risks.

The previous analysis is just one example of how trended credit data augments traditional static calculations to bring additional predictive power to credit assessments. All four of these building blocks of trended core credit management behaviors – balances, payments, amounts due and limits - have enhanced the predictive accuracy of VantageScore 4.0. Over 3,000 trended variables were assessed during the development of VantageScore 4.0, allowing the model to bring core credit management characteristics into the forefront in assessment of credit risk, resulting in deeper insights and significant improvements in prediction.

Figure 6 shows the changes from VantageScore 3.0, a model containing only static information, to VantageScore 4.0 in terms of contribution to score using the four major categories of characteristics. The main changes occur in areas where a consumer has real, tactical decisions to make versus the composition of trades in a credit report.

A larger focus in VantageScore 4.0 is placed on the direct activity consumers have in their credit usage, namely their core credit management behaviors, as well as new credit and inquiries. The weight of tenure and depth of credit related attributes is lessened when compared with VantageScore 3.0. There is also a slight decrease in the impact of past payment performance.

Figure 6: Comparisons of Contribution to Score: VantageScore 3.0 vs. VantageScore 4.0



CASE STUDY: HOW TRENDED CREDIT DATA CHANGES THE TRADITIONAL RISK PROFILE OF CONSUMERS

While it would be nice to understand how the ultimate credit decision would change by the use of trended credit data, there are far too many factors that go into that decision beyond the credit score. To understand the impact of trended credit data, we can look at how credit scores and the associated credit tiers for consumers may change when switching from a model using static-only data to one that incorporates trended credit data. For this analysis, we use credit scores produced by two models, VantageScore 3.0 using only static data and VantageScore 4.0 using both static and trended credit data. We consider five credit tiers based on the credit score, as described below. The credit score ranges and tiers are defined similarly for the two models.

Table 1: Credit Tier Categorization

Tier	Score Range	Description
Deep Subprime	< 600	Credit Users with severely delinquent recent accounts. Major derogatory events on file. Many closed accounts and have highest risk of default
Subprime	600-659	Users that have had severe payment history issues, typically still active but have high utlization rates.
Near Prime	660-719	Users that have not charged off may have had occasional missed payments but have higher than average utilization rates.
Prime	720-779	Better than average users of credit, have minor events occasionally on report. Have established credit history. Mid to low utilization rates. Will not have issues obtaining new credit.
Super Prime	780-850	Best in class users of credit. Established users of credit with strong credit management behaviors. Keep utlizations low and get best pricing for products.

To analyze the consumer impact, we examine the "swap sets" across credit tiers. What this means is for each group of consumers there is a subset that either gets "upgraded" (or "swapped up") to a better tier or "downgraded" (or "swapped down") to a worse or riskier tier when scored by a different model. Table 2 shows these movements for a randomly selected sample of 3 million consumers from 2016 switching from VantageScore 3.0 to VantageScore 4.0. Overall 32% of consumers, roughly 1 in 3, would see a credit tier change. Most of the changes occur in the Prime and Super-Prime tiers.

Table 2: Changes in Credit Tier Categorization Using Trended Credit Data vs Static Data

Range	Original VantageScore 3.0 Static Score Cut	% of Population	% Effected
Deep Subprime < 600	Stay	7.6%	5.2%
	Swap Up	3.0%	
	Swap Down	2.2%	
Sub Prime 600-659	Stay	12.5%	7.2%
	Swap Up	3.2%	
	Swap Down	4.0%	
Near Prime 660-719	Stay	8.8%	9.5%
	Swap Up	3.8%	
	Swap Down	5.7%	
Prime 720-779	Stay	9.5%	9.9%
	Swap Up	6.2%	
	Swap Down	3.7%	
Super Prime >= 780	Stay	29.8%	
		Overall Population Movement	31.8%

So, what is so different about these consumers that is revealed by trended credit data? Does trended credit data really improve the accuracy of the risk assessment? Tables 3, 4 and 5 provide the comparative risk levels between consumers who have been upgraded up into a particular credit tier (Swap Ups) and those downgraded and taken out of the same credit tier (Swap Downs) after originally scoring them with VantageScore 3.0 and then re-scoring them with VantageScore 4.0.

TABLE 3: Swap Set Default Rate Comparison: Auto Loans

Credit Tier	Tier Movement from Trended Data	Existing Accounts		New Accounts	
		Default (90+ DPD) Risk Rate	Reduction in Risk	Default (90+ DPD) Risk Rate	Reduction in Risk
Sub Prime 600-659	Swap Up	10.1%	24.6%	7.5%	26.8%
	Swap Down	13.5%		10.2%	
Near Prime 660-719	Swap Up	3.4%	20.5%	3.3%	30.8%
	Swap Down	4.3%		4.8%	
Prime 720-779	Swap Up	1.0%	30.6%	1.1%	29.8%
	Swap Down	1.4%		1.6%	
Super Prime >= 780	Swap Up	0.2%	55.5%	0.3%	39.9%
	Swap Down	0.5%		0.5%	

TABLE 4: Swap Set Default Rate Comparison: Bankcards

Credit Tier	Tier Movement from Trended Data	Existing Accounts		New Accounts	
		Default (90+ DPD) Risk Rate	Reduction in Risk	Default (90+ DPD) Risk Rate	Reduction in Risk
Sub Prime 600-659	Swap Up	19.1%	16.2%	17.8%	19.4%
	Swap Down	22.8%		22.1%	
Near Prime 660-719	Swap Up	6.9%	17.2%	7.3%	20.0%
	Swap Down	8.3%		9.1%	
Prime 720-779	Swap Up	2.0%	2.9%	2.5%	15.1%
	Swap Down	2.0%		2.9%	
Super Prime >= 780	Swap Up	0.3%	40.7%	0.5%	56.7%
	Swap Down	0.5%		1.3%	

TABLE 5: Swap Set Default Rate Comparison: Real Estate Loans

Credit Tier	Tier Movement from Trended Data	Existing Accounts		New Accounts	
		Default (90+ DPD) Risk Rate	Reduction in Risk	Default (90+ DPD) Risk Rate	Reduction in Risk
Sub Prime 600-659	Swap Up	13.2%	8.5%	5.5%	17.9%
	Swap Down	14.5%		6.7%	
Near Prime 660-719	Swap Up	3.9%	30.9%	2.2%	42.5%
	Swap Down	5.6%		3.8%	
Prime 720-779	Swap Up	1.1%	30.3%	0.4%	0.7%
	Swap Down	1.6%		0.4%	
Super Prime >= 780	Swap Up	0.2%	49.7%	0.1%	83.9%
	Swap Down	0.4%		0.4%	

Across every risk tier there is strong reduction (20%-40%) in the default risk of consumers upgraded or "swapped up" into a certain tier versus those deemed higher risk and "swapped down" and taken out of that tier when using trended insights. Both existing account management and new origination accounts see strong improvements using newly upgraded consumers evaluated with trended credit data. The results are displayed for Auto Loan, Bankcard and Mortgage products demonstrating a consistent pattern of lower risk (20-40%) at each credit tier for Swap Ups compared to Swap downs. The observations hold across new originations as well as existing accounts.

What changes are there in the evaluation of these consumers to raise/lower their risks? To explain the rationale in the changing risk assessments, the characteristics of the average consumer within each category are examined.

Table 6: Swap Set Static Credit Report Demographics

Credit Tier	Movement Using VS 4.0 with Trended	Depth/Breadth/Tenure					Core Credit Management		Payment History
		Have Open Bankcard	Have Open Auto	Have Open Mortgage	Have Open Intallment Loans	Age of Oldest Trade	Average Current Balance on Open Bankcards	Median Current Utiliization on Open Bankcards	No Missed Payments past 2 years
Sub Prime 600-659	Swap Up	69.3%	52.8%	18.5%	71.2%	151	$3,634	86	7.4%
	Swap Down	15.7%	22.4%	9.4%	44.3%	130	$4,138	99	17.9%
Near Prime 660-719	Swap Up	84.4%	54.9%	27.7%	69.7%	170	$5,857	56	47.5%
	Swap Down	51.0%	28.6%	16.9%	43.2%	175	$11,344	78	72.7%
Prime 720-779	Swap Up	91.6%	54.2%	34.0%	65.9%	184	$5,924	22	76.7%
	Swap Down	58.3%	25.6%	24.3%	37.0%	207	$10,885	43	88.3%
Super Prime >= 780	Swap Up	98.1%	42.1%	35.5%	51.4%	212	$4,136	7	90.8%
	Swap Down	81.3%	28.4%	38.7%	36.4%	266	$8,470	22	96.2%

Table 6 shows some static credit file attributes on the swap up/down consumers. The consumers in the Swap Down sets have longer tenures and cleaner payment histories (i.e., no missed payment issues). Static-scoring models weigh these elements more heavily and these consumers are hence given the benefit of having older trade lines and no minor payment bumps. The Swap Up consumers have more types of credit active on their credit reports as seen by the higher percentage of them having active bankcard, mortgage, auto and installment loans. On the other hand, revolving bankcard balances and utilizations are typically significantly higher for the Swap Down set compared to their Swap Up counterparts, indicating they are higher risk in the core credit management behaviors but less emphasis is placed on these behaviors in the static model.

Table 7 leverages the trended views on these same consumers highlighting how the static model misses the risk signals these consumers exhibit in the recent past.

Table 7: Swap Set Trended Credit Report Demographics

Credit Tier	Movement Using VS 4.0 with Trended	Bankcard/Revolving Trends				Auto/Mortgage Trends	
		Average monthly utilization on open bankcard trades in the past 6 months	Average monthly utilization on open revolving trades in the past 12 months	Maximum monthly utilization on open bankcard trades in the past 12 months	Number of balance decreases on open revolving trades in the past 24 months	Average change in balance on open auto trades in the past 3 months	Average change in balance on open first mortgage trades in the last 3 months
Sub Prime 600-659	Swap Up	82	73	98	10	$596	$891
	Swap Down	91	80	101	6	$90	$776
Near Prime 660-719	Swap Up	55	49	84	11	$724	$1,278
	Swap Down	74	60	96	9	$197	$587
Prime 720-779	Swap Up	24	24	50	11	$725	$1,814
	Swap Down	43	37	69	10	$459	$743
Super Prime >= 780	Swap Up	7	9	20	12	$609	$1,991
	Swap Down	20	17	35	10	$552	$1,451

In addition to higher current and historical utilization rates observed for Swap Downs, their utilization rates over the most recent 6 months are systematically higher than their 12-month averages indicating that these consumers are trending upwards in utilization. The Swap Up consumers appear much more stable. Likewise, the maximum utilization rates over the past 12 months are 15-20% higher for Swap Downs compared to Swap Ups, and Swap Up consumers show more balance decreases.

Additional trended insights come from installment tradelines as well. Consumers in the Swap Up sets who have auto and mortgage loans show much higher balance pay-downs than Swap Down consumers. This suggests either a more aggressive payment strategy, or older loans nearing end-of-term -where a higher share of the payment goes towards the principal. In either case, this suggests these consumers are better positioned to take on new loans and have shown successful management on their installment loans.

CONCLUSIONS

Trended credit data changes the lens on consumer credit risk by applying a more direct "consumer behavior" element to the risk assessment. Trended attributes can track the credit management decisions consumers make over time and can offer valuable insights to how consumers tackle their obligations, allowing significantly improved prediction accuracy and better decisions for lenders.

Prudent users of credit demonstrate strong, stable credit behaviors and trended evaluations demonstrate that these consumers have their financial obligations under control. Alternatively, insights offered by trended credit data can also help identify consumers who exhibit greater fluctuations in credit related behaviors and periods of heightened stress. Such insights provided by the observation of historical trends allow for better risk separation above and beyond what static information may be able to provide.

While the traditional, static attributes such as payment history and tenure predict risk, they offer little in terms of what consumers can do to improve their credit score. These attributes are either very slow to change (i.e., age of oldest trade) or may be overly punitive in the case of a untidy payer versus true defaulter (i.e., the amount of the missed payment is never assessed just the occurrence). The addition of trended credit data alongside the traditional credit score metrics allow for a comprehensive evaluation of a credit user's direct credit management healthiness.

VantageScore 4.0 is the only tri-bureau generic credit scoring model currently available that incorporates the insights provided by trended credit data; ultimately, providing superior predictive accuracy across all product types for new as well as existing accounts when compared to other models leveraging only static information.

The VantageScore credit score models are sold and marketed only through individual licensing arrangements with the three major credit reporting companies (CRCs): Equifax, Experian and TransUnion. Lenders and other commercial entities interested in learning more about the VantageScore credit score models, including the VantageScore 4.0 credit score model, may contact one of the following CRCs listed for additional assistance:

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