

# EVALUATING GSE SERVICING RIGHTS WITH EXTENDED CONSUMER CREDIT DATA: VALUATION AND SENSITIVITY ANALYSIS

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Since the September 2024 release of our first paper— “Insights on Mortgage Delinquencies and Prepayments from Trended Data”—to study the efficacy of additional data provided by Experian on mortgage prepayment and credit models, Andrew Davidson & Co., Inc. (AD&Co) has shifted its focus to VantageScore 4.0. Per the guidance provided by the Federal Housing Finance Agency, the mortgage market has been transitioning from solely using Classic FICO to allowing the use of either Classic FICO or VantageScore 4.0 (VS4). We found that while VS4 has trended effects, there is still significant explanatory power—beyond that of a VantageScore 3.0 or 4.0 credit score—in some of the variables we studied across more than 2,000 consumer-level attributes.

## Key Findings

- 1. Borrower payment behavior at origination remains a significant predictor of delinquency risk:** Distinguishing between Transactors and Revolvers provides meaningful insight, with High Pay Ratio Revolvers exhibiting notably elevated delinquency rates—an effect that is especially pronounced among borrowers with lower credit scores.
- 2. Incorporating updated consumer information enhances predictive accuracy:** Borrowers who recently completed a balance consolidation or transfer demonstrate a lower likelihood of becoming delinquent, even after controlling for updated credit scores. This indicates that recent shifts in payment behavior carry incremental predictive value.
- 3. Balance Consolidators exhibit faster prepayment tendencies:** During the 2018–2019 period, consumers engaging in consolidation activities prepaid at higher rates than Transactors, suggesting distinctive behavioral patterns relevant for portfolio and servicing strategies.
- 4. Sloppy auto payment behavior signals elevated risk:** Borrowers showing signs of late or inconsistent auto payments tend to experience higher delinquency rates, likely reflecting underlying cash-flow stress or behavioral frictions.
- 5. Front-end DTI remains a powerful indicator of mortgage performance:** Lower front-end debt-to-income (DTI) ratios—derived using Experian’s income model—correlate strongly with reduced delinquency risk, reinforcing the importance of income-aligned capacity metrics.

All findings are derived while controlling for VantageScore 4.0, which already incorporates trended credit data, underscoring the incremental value of these additional behavioral attributes.

## Caveats

1. Few Transactors (approximately 1.5%) have a credit score below 660.
2. With respect to voluntary prepayments, balance consolidation or balance transfer matter less when mortgages are seasoned and burnt out, while Transactors matter less when mortgages have a rate incentive to prepay and are not burnt out.
3. The interest rate environment impacts voluntary prepayments, making the time frame important.

## 1. Data and Methodology

For this study, we analyzed a random sample of Fannie Mae (FNMA) mortgages with terms of 360 months, originated between 2012 and 2019, and still active at some point during the two-year period 2018/01–2020/01. To attain sufficient data for consumers having lower credit scores, we sampled at different rates by credit score (40% for < 720 vs. 10% for ≥ 720); our analysis generally controls for credit score, thus avoiding bias while also demonstrating the additional lift that can be gained by various new data elements. To minimize the impact of seasoned loans in the study, we focused on the more recent originations (2016–2019).

Our two-year time series combines anonymized data elements available within Experian’s Ascend Analytical Sandbox, which contains credit data, credit scores, and loan attributes, as well as nationwide property data matched at loan level. Specifically, the following information is used:

- Monthly mortgage balances and payment performance during the two-year period 2018/01–2020/01, pulled from Experian’s trade table
- LTV at origination, pulled from Experian’s property-matched mortgage-level performance dataset
- Consumer VantageScore 4.0 at loan origination
- A selection of consumer trended attributes at loan origination
- A selection of updated consumer trended attributes each month during 2018/01–2020/01
- Front-end mortgage DTI as computed by Experian

The main attribute we will discuss in this paper is Experian’s PaymentBehaviorSeg, a trended attribute that segments consumers according to balance transfer/consolidation or payment activity on bankcard revolving and charge cards. This metric extends the binary Transactor/Revolver metric into more granular categories of revolving credit balance management and expanded coverage, which we describe below.

## 2. Consumer PaymentBehaviorSeg Details

The trended 3D attribute PaymentBehaviorSeg categorizes consumers based on balance transfer/consolidation or payment activity on bankcard revolving and charge cards during the prior 12 months. Consumers with any known relevant bankcard and charge card activity typically fall into one of five categories:

- Balance Consolidation: At least one balance consolidation activity from multiple trades to one
- Balance Transfer: At least one balance transfer activity
- Low Pay Ratio Revolver: Payment ratio is less than 15% (close to minimum)
- High Pay Ratio Revolver: Payment ratio is at least 15%, but less than 85%
- Transactor: Payment ratio is greater than or equal to 85%

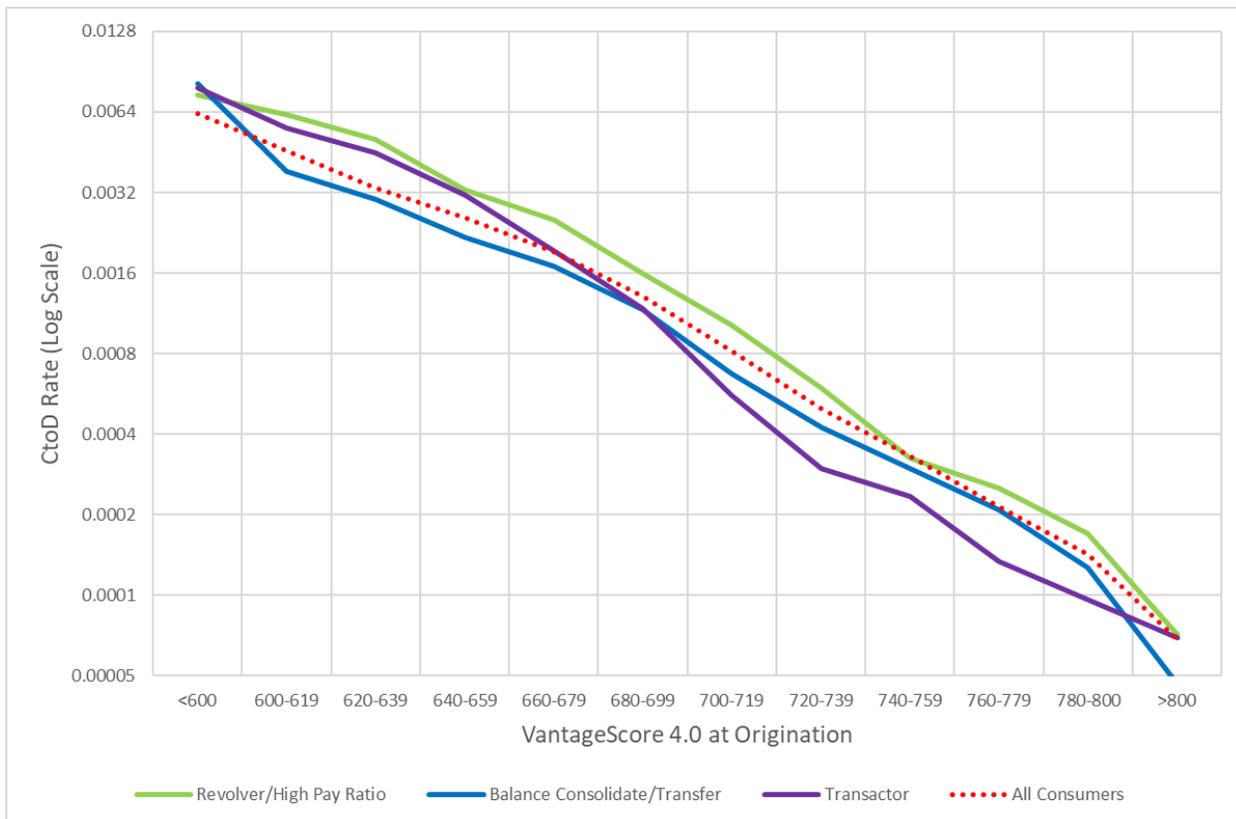
Here, “payment ratio” refers to the sum of the actual payments divided by the sum of the balances each month over the 12-month period. Note that these categories are assigned in order from top to bottom; for example, if a consumer has balance consolidation/transfer activity they will not be classified as a Transactor or a Revolver. Compared with a pure Transactor/Revolver metric, these early balance-specific categories allow more consumers to be classified overall, since many credit card companies do not report payment amounts. At the same time, assigning the balance-specific categories first means that the Transactor/Revolver classifications are conditional on not meeting those initial criteria, which could change the nature of the consumers in those segments. Note also that the division of Revolvers into two categories provides for a more granular classification than a pure Transactor/ Revolver metric—and one could conceive of including yet an even finer gradation of payment behavior.

### 3. A Look at Various Transitions

#### PaymentBehaviorSeg at Origination

We found that High Pay Ratio Revolvers have higher CtoD (loans going from current to delinquent state) rates across the board compared to average borrowers, and the difference is greater for those with lower credit scores. Transactors have lower CtoD rates as scores increase. Even though Transactors have higher CtoD rates than average for lower scores, there are very few observations in that region. Balance Consolidators do not provide much lift to CtoD rates but are generally a bit lower than average.

**Figure 1. FNMA CtoD by Origination PaymentBehaviorSeg (Controlling for Origination VantageScore 4.0)**



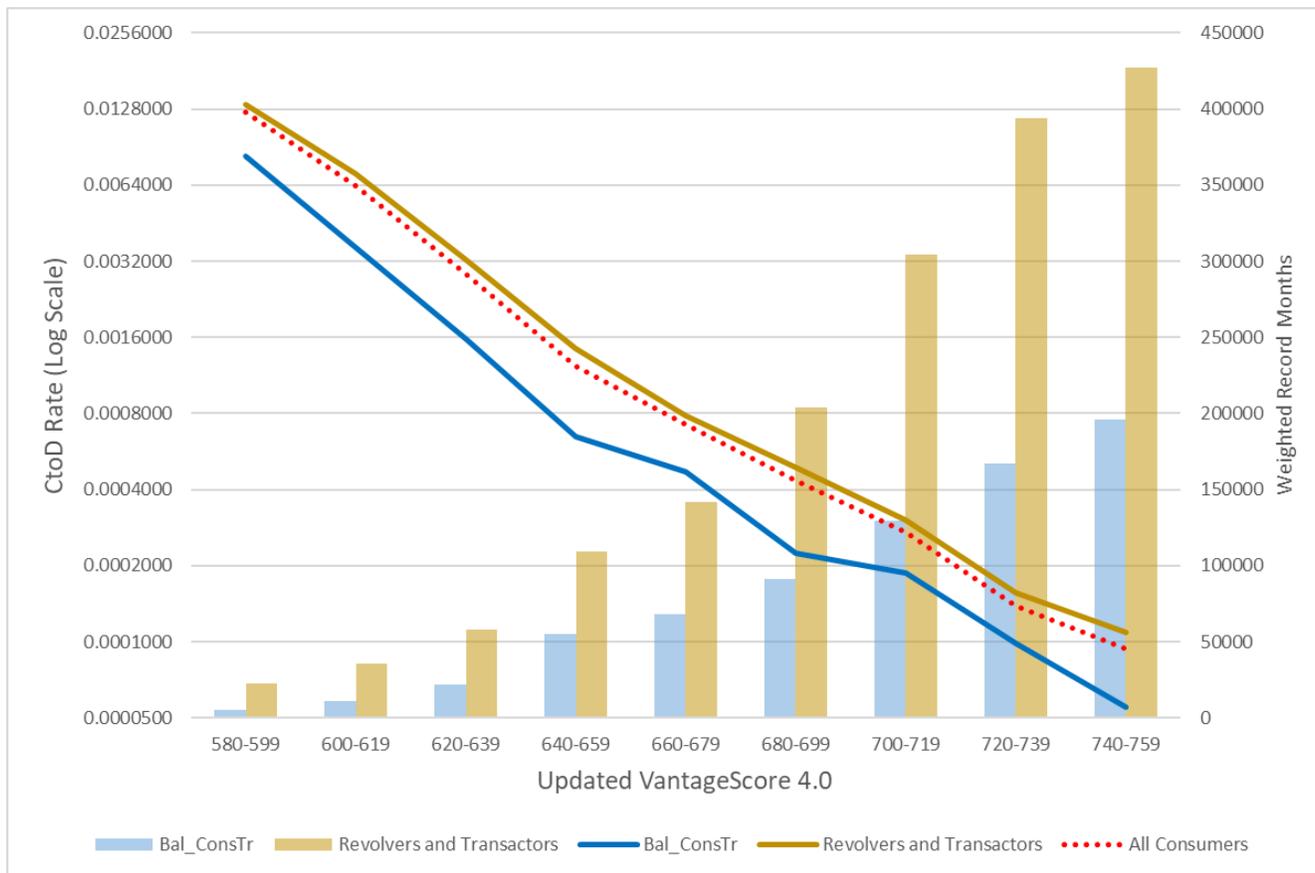
**Table 1. CtoD Multipliers for PaymentBehaviorSeg Categories**

Multipliers when controlling for Origination Vantage 4	Balance Consolidate / Transfer	Baseline	Revolver with High Pay Ratio	Transactor
Low credit bins (below 680)	0.88	1	1.33	1.14 (1.26 below 660 and 1.01 for 660-679)
Middle credit bins (680 - 739)	0.85	1	1.22	0.68
High credit bins (740 - 799)	0.92	1	1.14	0.67

We see that the multipliers are lower than the baseline for all Balance Consolidate/Transfer categories and Transactors except those in low credit bins. The multipliers are higher for all High Pay Ratio Revolvers.

It is natural to ask, Does updated PaymentBehaviorSeg provide more predictive power beyond the updated credit score? “Updated” is defined as 2 months before the delinquency happens. We see that recent Balance Consolidator behavior is a better predictor of delinquencies (they are less risky on average) than being either a Transactor or a Revolver.

**Figure 2. FNMA CtoD by Updated PaymentBehaviorSeg (Controlling for Updated VantageScore 4.0)**



**Table 2. The average multipliers for CtoD by updated PaymentBehaviorSeg when controlled for updated VS4**

Multipliers when controlling for Origination Vantage 4	Balance Consolidate / Transfer	Baseline	Revolvers/Transactors
Lower credit bins (below 760)	0.63	1	1.13

## 4. Sloppy Auto Payments

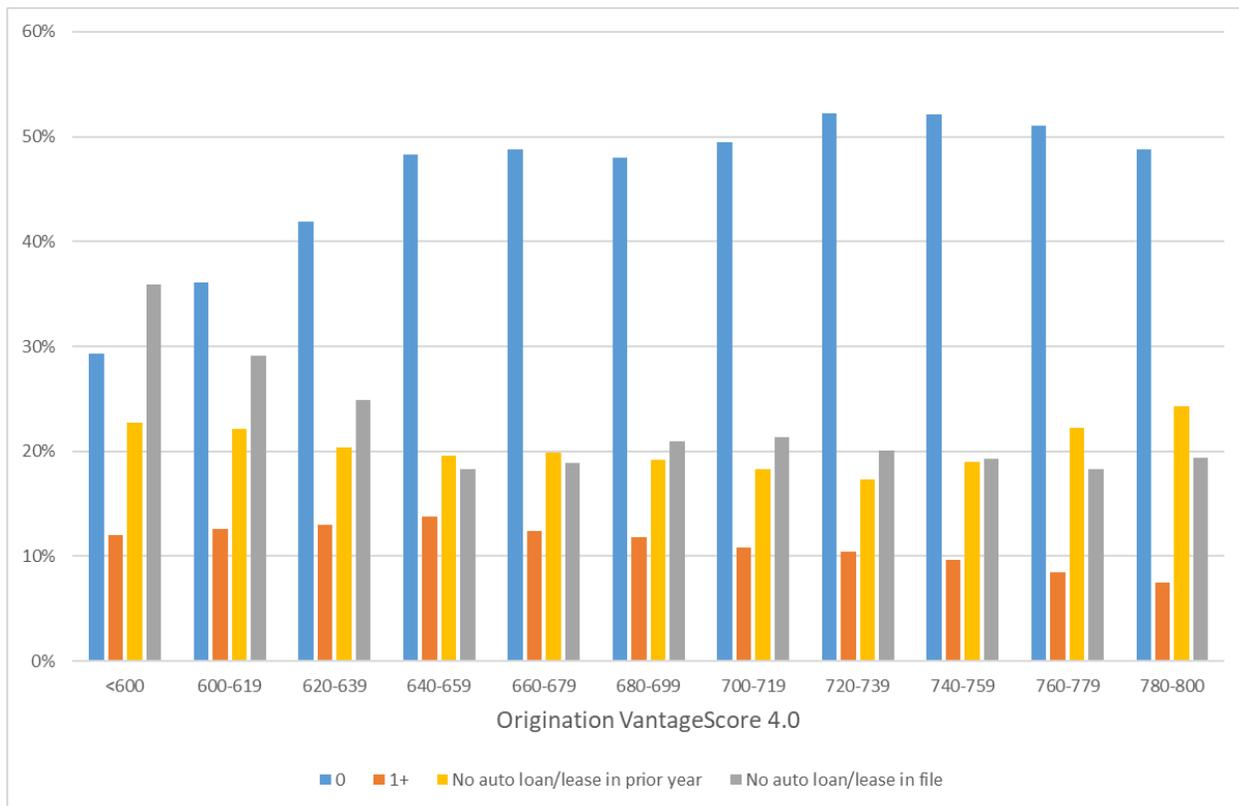
Another interesting and predictive variable we looked at is Sloppy Auto Payments. After evaluating over 2,000 consumer-level attributes, this particular attribute was found to hold meaningful predictive power for mortgage CtoD rates.

Experian uses the following criteria to define the variable:

- There is no delinquency reported on the trade; AND
- The balance went up slightly compared to the previous month's balance; AND
- The last payment dates indicate consumers are late in making payments.

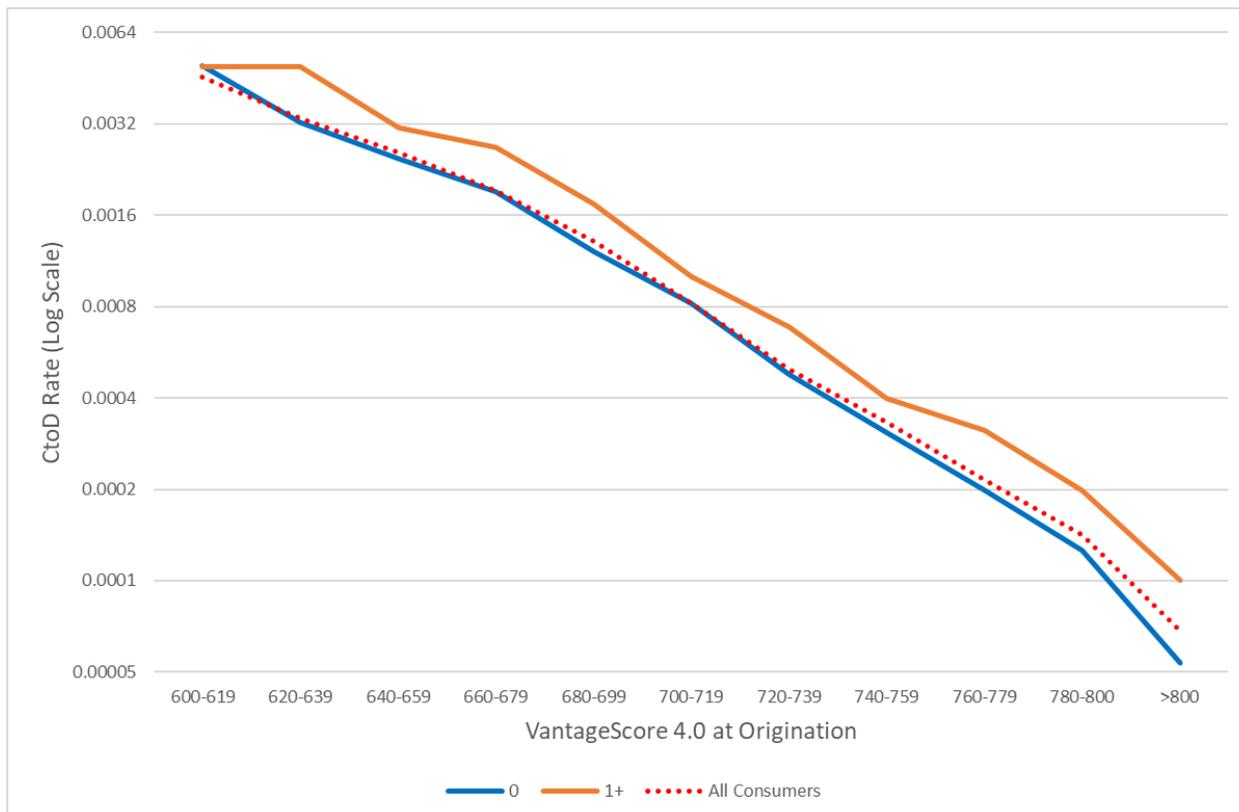
The Sloppy Auto Payment field indicates the number of sloppy auto loan or lease payments that occurred during the prior year; we simply binned this as “0” or “1+.” Sometimes the consumer did not have a relevant auto loan or lease in their file during that prior year, and sometimes they had no such trade in their file at all.

**Figure 3. Distribution of Sloppy Auto Payments by Credit Score Bin**



The data shows that, controlling for VantageScore 4.0 at origination, consumers with sloppy auto payments at the time of origination tend to go delinquent about 34% more often than average.

**Figure 4. CtoD by Origination Sloppy Auto Payments (Controlling for Origination VantageScore 4.0)**



**Table 3. Approximate average multipliers for CtoD by existence of Sloppy Auto Payments, when controlling for VS4**

Multipliers when controlling for Vantage 4.0	0 Sloppy Auto Payments	Baseline	1+ Sloppy Auto Payments
Using and Controlling for Values at Origination	0.95	1	1.34

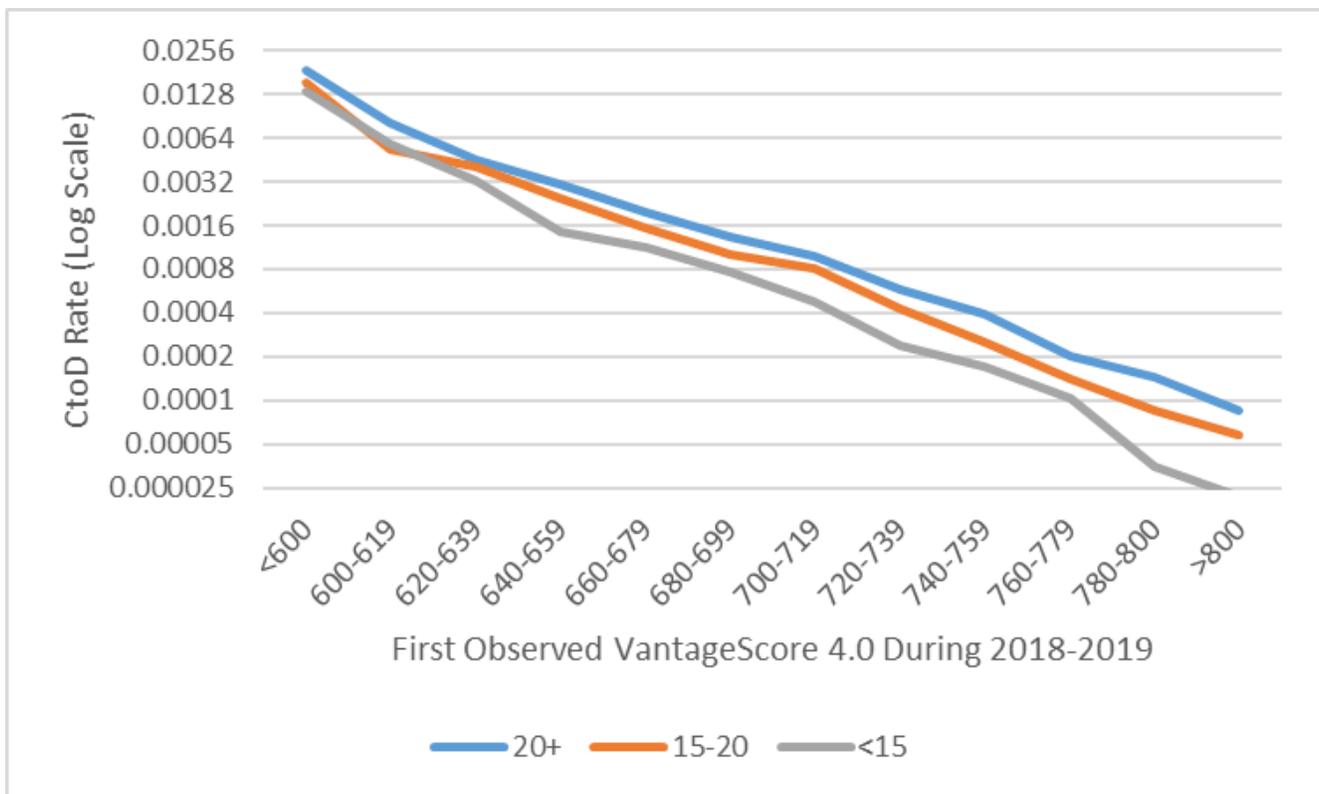
We cannot be certain of the reasons behind sloppy payments; they could be due to cash flow constraints or plain carelessness. However, data confirms that this behavior does affect mortgage delinquencies.

## 5. Mortgage DTI

The Debt-to-Income (DTI) variable was calculated using Experian’s proprietary income model. As a credit bureau, Experian has access to all debt that a consumer has across various trades.

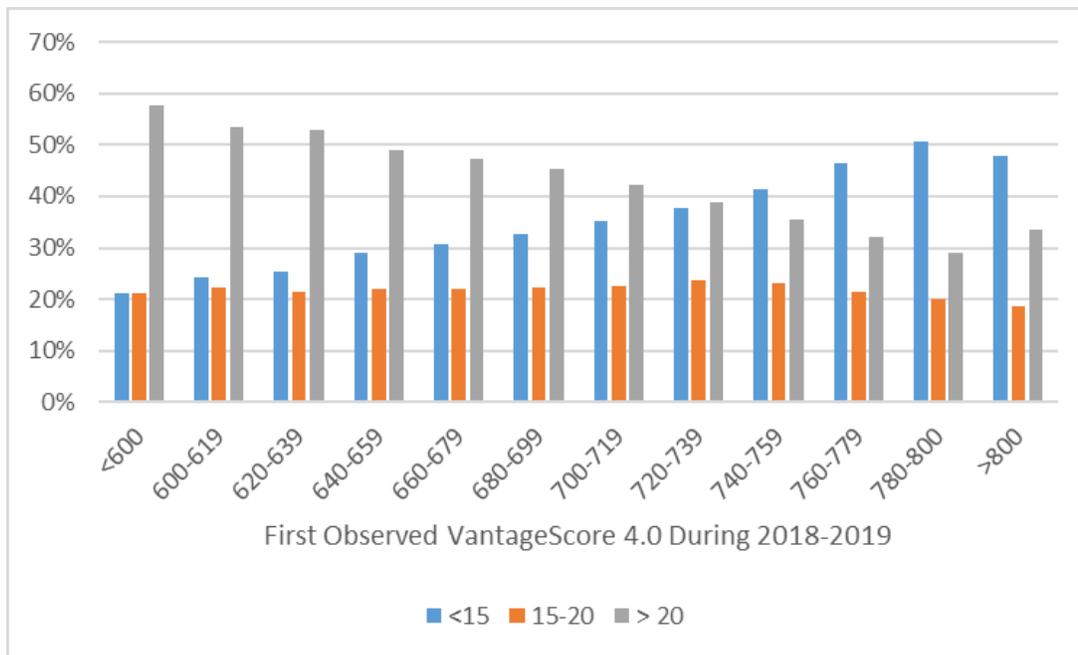
Figure 5 below shows that the separation by DTI bucket is greater for borrowers with higher credit scores. In general, mortgage CtoD increases as front-end DTI (mortgage-only) increases.

**Figure 5. CtoD by First Observed Front-End DTI (During 2018–2019 and Controlling for First Observed VantageScore 4.0)**



The distribution of front-end DTI shows that the share of DTI less than 15% increases as we move up the origination credit spectrum.

**Figure 6. Distribution of Front-End DTI by Credit Score Bin**



## 6. A Look at CtoT (Loans Going from Current to Terminated or Prepaid State) Transitions by PaymentBehaviorSeg

Since the time series covers 2018–2019, we refer to the older originations (2016–2017) as “seasoned,” versus those originated during this time period as “new.”

The chart and table below show the primary agency mortgage rates from 2016 to 2019. On average, the seasoned loans do not have much incentive to refinance during 2018–2019, although the mortgage rates will vary for individual loans and there could be some credit curing.

**Figure 7. Primary Agency Mortgage Rates**

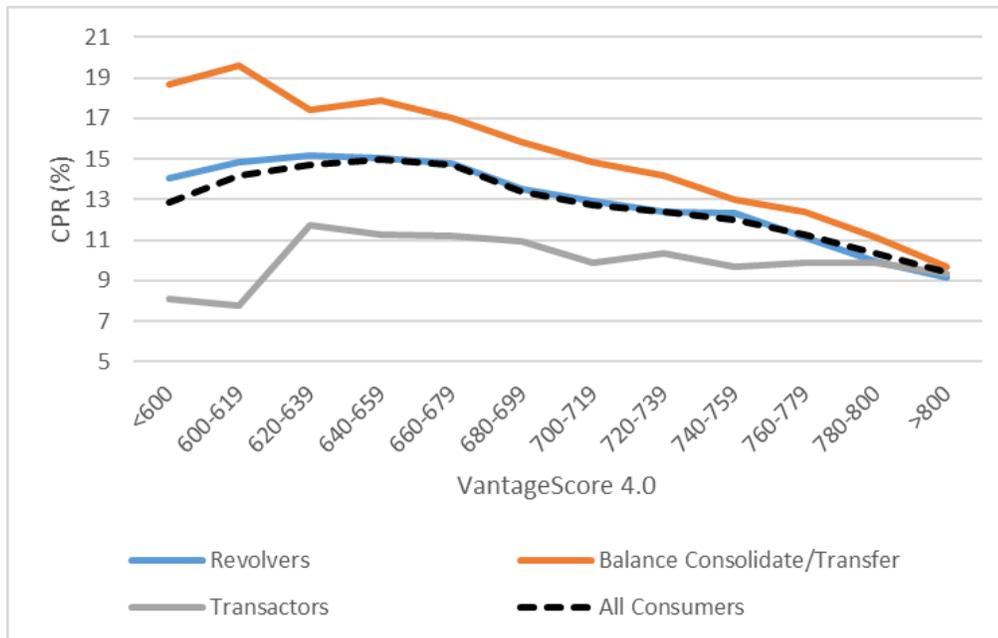


**Table 4. Average Primary Agency Mortgage Rates**

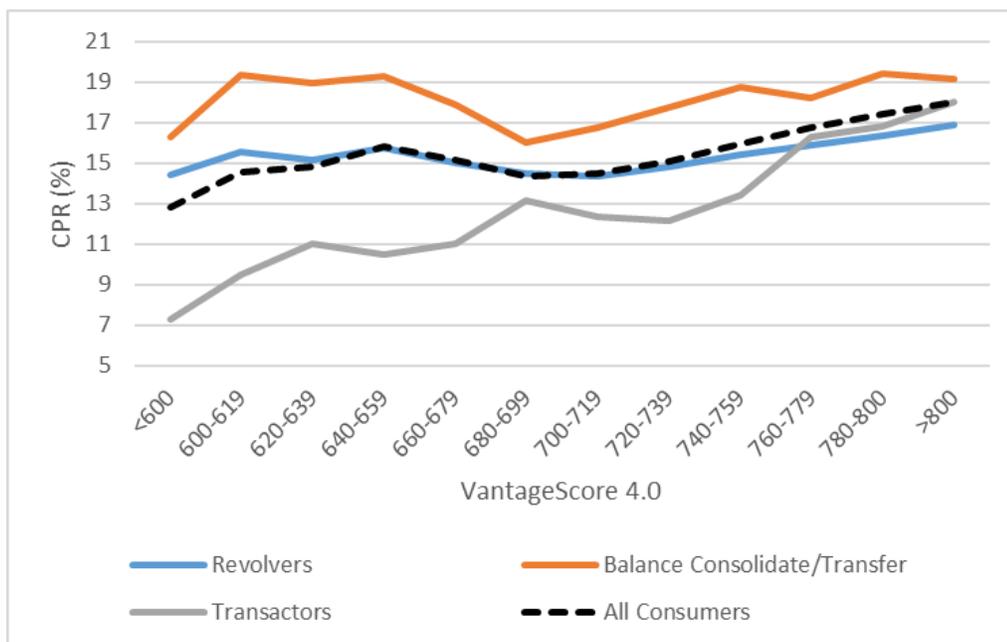
	Origination Year	Average PMMS Rate during Origination Year
<b>Seasoned</b>	2016	3.65
	2017	3.99
<b>New</b>	2018	4.54
	2019	3.94

The graphs below show the prepayment (CtoT) trends for both new and seasoned loans.

**Figure 8. CtoT by PaymentBehaviorSeg at Origination for Seasoned Loans (Originated 2016–2017 and Controlling for Origination VantageScore 4.0)**



**Figure 9. CtoT by PaymentBehaviorSeg at Origination for New Loans (Originated 2018–2019 and Controlling for Origination VantageScore 4.0)**



The multipliers when controlling for VS4 are shown below.

**Table 5. CtoT Multipliers by PaymentBehaviorSeg**

Multipliers when controlling for Origination Vantage 4.0	Balance Consolidate / Transfer		Baseline	Transactor	
	Seasoned	New		Seasoned	New
Low credit bins (below 680)	1.21	1.24	1	0.73	0.68
Middle credit bins (680-759)	1.15	1.18	1	0.8	0.83
High credit bins (above 760)	1.06	1.09	1	0.96	0.98

These multipliers show that Balance Consolidators for both new and seasoned loans have higher CtoT rates than Transactors for both low and middle credit bins. The effect for high credit bins is muted.

## 7. Further Studies

The results in this study are based on a specific two-year period when rates went up and then came back down. To understand the effects in other rate environments, we should look at different time periods. Even though VantageScore 4.0 has trended effects, there is still explanatory power in some of the variables that we studied in this paper. This is an evolving area of research, and we are studying the impact of the various Experian proprietary variables on the analytics used in the mortgage ecosystem.

This section covered some behavioral aspects of mortgage borrowers and trended data. The following section highlights the impact of the multipliers on the valuation of mortgage servicing rights.

## 8. MSRK Valuation Framework

Building on our study of Experian’s trended data and enhanced explanatory variables, we now apply AD&Co’s Mortgage Servicing Rights Kinetics (MSRKinetics, or MSRK) application for two primary purposes: 1) to quantify the risk and value dynamics of servicing rights, and 2) to isolate and measure the specific valuation impact of Experian’s proprietary expanded consumer credit data.

MSRK combines AD&Co’s LoanDynamics Model (LDM, an empirically built consumer behavioral model); our MacroDynamics, which includes stochastic models of interest rates, housing prices and unemployment rates; and a servicing cash flow engine. This integrated application enables users to calculate a wide variety of servicing risk and value metrics and sensitivity analyses.

This framework integrates Experian’s proprietary enhanced consumer credit data to improve model predictability, utilizing CtoD multipliers from Table 1 and CtoT multipliers from Table 5. We apply it to a synthetic portfolio of 12 government-sponsored enterprise (GSE) loans that vary by coupon (3% discount, 6.5% par, 7% premium) and credit risk (low risk: 750 FICO/70 loan-to-value (LTV); higher risk: 650 FICO/90 LTV). We discount cash flows in a Monte Carlo framework using a constant Option-Adjusted Spread (OAS) of 350 bps, ensuring risk-adjusted return parity and isolating the impact of loan and borrower characteristics.

## 9. Base Valuation and Key Metrics

The base valuation reveals the fundamental economics of MSRs (see Table 6), ranking prices from high to low and detailing crucial metrics—including Yield, Interest-Only (IO) Multiple, Weighted Average Life (WAL), Effective

Duration, Default, and Present Value (PV) Servicing Cost—by coupon and credit tier. The key insights are:

- **Operational Credit Risk:** Lower-credit loans (650 FICO, 90 LTV) generate higher expenses because the cost of servicing delinquent loans can be 10 times higher than for current loans using electronic payments. These forecasted costs rise 7 to 15 bps, or 20% to 100%. We show that servicing value for these loans may go up or down depending on the interplay between servicing cost and prepayment speed.

Two components drive the present value of operational credit risk: the timing of cumulative expenses and the dynamic discount factor that depends on prepayment speeds. This interplay is highlighted by higher PV cost for discount loans, even though cumulative defaults are lower and IO multiples are higher. The reason is that the delinquency profile requires time to ramp up. Thus, when forecasting, seasoned delinquencies are immediately high, while delinquencies for new loans may take a couple of years to mature.

- **Coupon and Prepayment Risk:** Discount MSR (3%) exhibit the highest prices, longest WAL, and lowest default rates, as they are deeply "out-of-the-money" and unlikely to prepay. Default rates decrease because positive home price appreciation outweighs the longer life that would otherwise provide more opportunity for loans to default. Par and premium MSRs have lower base prices due to their heightened exposure to refinancing.

- **The IO Multiple:** This is a crucial valuation metric specific to MSRs. It represents the present value of the future servicing fee income stream, expressed as a multiple of the annual servicing fee (e.g., 25 bps). A higher IO multiple indicates a more valuable, longer-duration income stream, as is observed in stable low-coupon MSRs. Detailed inspection shows that while the multiple is driven principally by the note rate, it is also impacted by creditworthiness; lower-risk loans have an easier time refinancing or getting new loans.

- **Effective Duration:** The portfolio clearly demonstrates the negative effective duration inherent to MSRs because revenue is an interest-only strip. Values increase when rates rise (prepayments slow) and decrease when rates fall (prepayments accelerate). This negative duration is most pronounced for premium coupons (e.g., -34.6), indicating they are highly sensitive to interest rate volatility. Consequently, this metric is paramount for determining the need to hedge and the appropriate hedge ratios to mitigate interest rate risk.

**Table 6. Base Run – Without Using Expanded Variables**

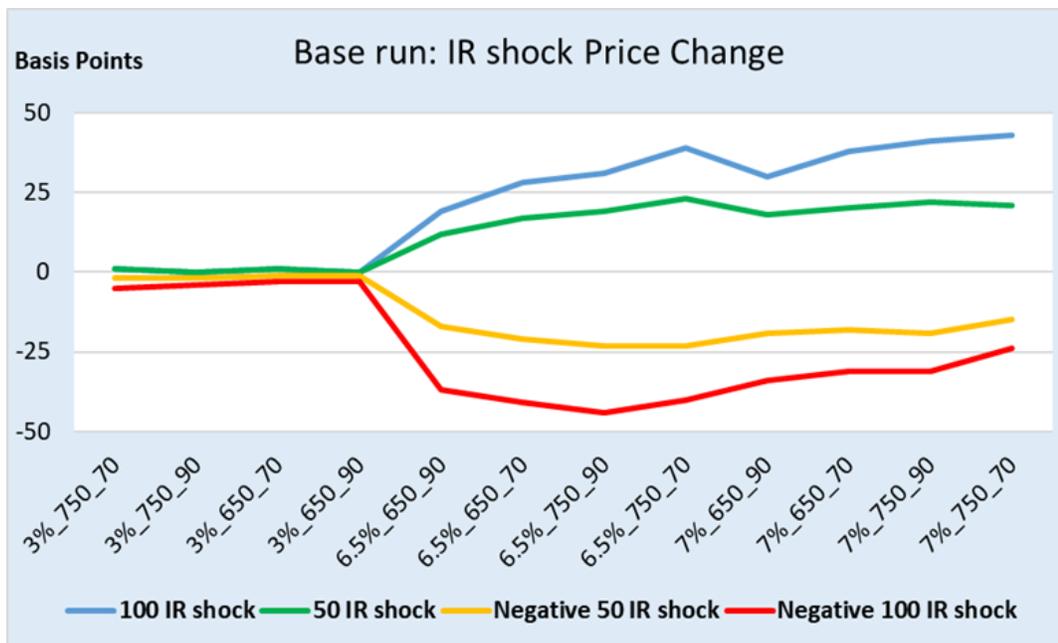
Loan ID	Price \$	Yield (FC) %	IO Multiple	WAL (FC)	Eff Dur	Cum Def	PV Serv Cost
3%_750_70	1.76	7.97	7.0	10.4	-1.2	0.48	-0.42
3%_750_90	1.75	7.96	7.0	10.4	-1.0	1.06	-0.43
3%_650_70	1.70	7.97	6.8	10.3	-0.9	1.05	-0.46
3%_650_90	1.66	8.01	6.6	10.3	-0.7	2.30	-0.49
6.5%_650_90	1.38	10.67	5.5	9.2	-21.6	5.92	-0.38
6.5%_650_70	1.36	10.44	5.4	8.4	-28.4	2.52	-0.30
6.5%_750_90	1.36	10.57	5.4	8.2	-31.4	2.39	-0.26
6.5%_750_70	1.26	8.96	5.0	6.4	-37.2	1.00	-0.21
7%_650_90	1.20	9.14	4.8	6.4	-31.6	5.01	-0.31
7%_650_70	1.15	7.02	4.6	4.9	-34.8	2.02	-0.23
7%_750_90	1.13	6.58	4.5	4.5	-37.3	1.87	-0.19
7%_750_70	1.06	5.42	4.2	3.6	-34.6	0.74	-0.16
<b>Average</b>	<b>1.40</b>		<b>5.6</b>	<b>7.8</b>		<b>2.20</b>	<b>-0.32</b>

## 10. Interest Rate Sensitivity

The rate shock analysis in Figure 2 deconstructs the non-linear, option-like profile of MSR values as follows:

- Discount Loans (3%): These show minimal price change across shocks. Being far “out-of-the-money,” their cash flows are largely “locked in” and insensitive to near-term rate moves.
- Par and Premium Loans (6.5%, 7.0%): These loans display pronounced sensitivity. A +100 bps shock increases their value (prepayments slow, extending WAL). A -100 bps shock drastically reduces value (refinancing incentives surge).
- Optionality of Par Loans: Par coupons often exhibit the greatest sensitivity (highest gamma) around the current mortgage rate, as they are “at-the-money.” Small rate moves immediately change their refinancing probability, giving them the most embedded optionality.
- Credit Quality Interaction: Higher FICO loans are more rate sensitive. Credit-constrained (lower FICO) borrowers have more obstacles to refinancing, dampening the prepayment response to rate declines. This makes the MSRs on their loans slightly less volatile.

**Figure 10. Base Run: IR Shock Price Change**



## 11. The Impact of Consumer Segments

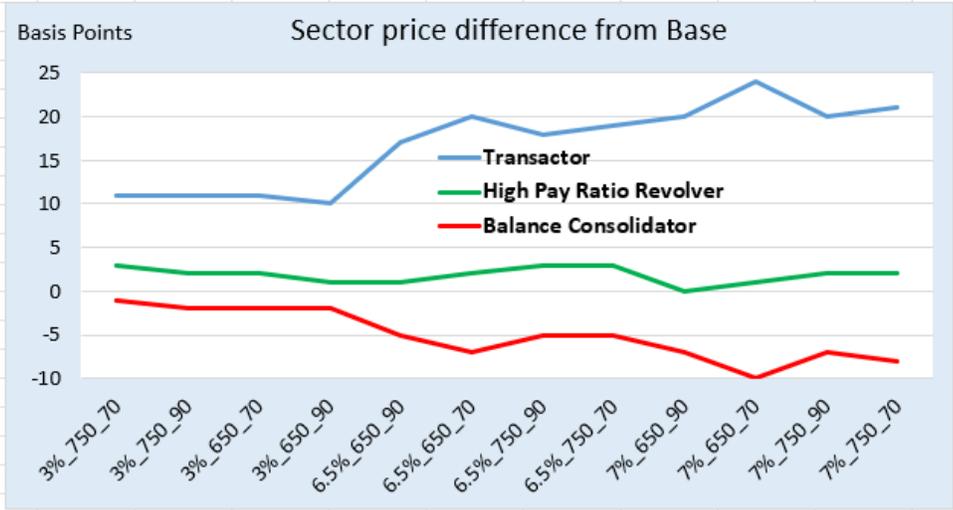
Translating trended data credit attributes into behavioral segments reveals significant valuation dispersion (see Figure 11 and Tables 7-10):

- Transactors (highest value): Generally characterized by slower prepayment speeds, this segment adds substantial value (+20 bps for recent vintages). They tend to maintain their mortgages longer, making the servicing income stream more durable. On a \$400,000 loan, this translates to a positive economic value of \$440 to \$960 (Table 10), with premium loans (7% coupons) deriving the greatest benefit from this stability.
- Balance Consolidators (least value): Their propensity to refinance (~5%<sup>1</sup> faster) lowers MSR value through accelerated prepayments, outweighing the minor benefit from slightly lower credit costs. This results in negative economic value, ranging from -400 to -8 (Table 10), for the servicer on a per-loan basis.

<sup>1</sup> The 5% faster propensity to refinance between Balance Consolidator vs the Base run is taking the average IO of the 6.5% par and 7% premium loans of the Balance Consolidator (4.76) divide by the average IO of the 6.5% par and 7% premium loans of the Base run (5%).  $4.75/5 = 95\%$ .

- High Pay Ratio Revolvers (mixed offset): These consumers make medium monthly revolving credit payments and present a neutral to slightly positive effect (+2 bps) on servicing rights. Their behavior creates offsetting forces: marginally higher delinquencies than baseline consumers result in slightly lower prepayments.

**Figure 11. Sector Price Difference from Base**



**Table 7. Transactor Differential to Base Loans**

Loan ID	Price Diff (BPs)	Yield (FC) Diff	Multiple Diff	WAL (FC) Diff	Cum Def Diff	PV Serv Cost Diff
3%_750_70	11	-1	0.5	0.9	-0.13	0.03
3%_750_90	11	0	0.4	0.9	-0.28	0.03
3%_650_70	11	1	0.4	1.1	0.29	0.06
3%_650_90	10	2	0.4	1.0	0.60	0.06
6.5%_650_90	17	-38	0.7	1.9	1.79	0.08
6.5%_650_70	20	-32	0.9	2.0	0.85	0.07
6.5%_750_90	18	-23	0.8	1.6	-0.49	0.03
6.5%_750_70	19	14	0.8	1.6	-0.21	0.04
7%_650_90	20	10	0.8	2.0	1.69	0.08
7%_650_70	24	67	0.9	2.0	0.79	0.07
7%_750_90	20	61	0.8	1.5	-0.33	0.04
7%_750_70	21	83.00	0.90	1.40	-0.13	0.03
<b>Average</b>	<b>17</b>		<b>0.7</b>	<b>1.5</b>	<b>0.4</b>	<b>0.05</b>

**Table 8. Balance Consolidator Differential to Base Loans**

Loan ID	Price Diff (BPs)	Yield (FC) Diff	Multiple Diff	WAL (FC) Diff	Cum Def Diff	Serv Cost Diff
3%_750_70	-1	-0.01	0.00	-0.20	-0.03	-0.01
3%_750_90	-2	0.00	-0.10	-0.20	-0.07	-0.01
3%_650_70	-2	0.00	-0.10	-0.30	-0.12	-0.01
3%_650_90	-2	-0.01	0.00	-0.40	-0.24	-0.01
6.5%_650_90	-5	0.25	-0.20	-0.50	-0.64	-0.03
6.5%_650_70	-7	0.18	-0.20	-0.70	-0.31	-0.02
6.5%_750_90	-5	0.13	-0.10	-0.50	-0.19	-0.01
6.5%_750_70	-5	-0.16	-0.20	-0.50	-0.09	-0.01
7%_650_90	-7	-0.18	-0.30	-0.70	-0.62	-0.03
7%_650_70	-10	-0.64	-0.40	-0.80	-0.29	-0.03
7%_750_90	-7	-0.55	-0.20	-0.50	-0.18	-0.01
7%_750_70	-8	-0.71	-0.30	-0.50	-0.09	-0.02
<b>Average</b>	<b>-5</b>		<b>-0.2</b>	<b>-0.5</b>	<b>-0.2</b>	<b>-0.02</b>

**Table 9. High Pay Ratio Revolver Differential to Base Loans**

Loan ID	Price Diff	Yield (FC) Diff	Multiple Diff	WAL (FC) Diff	Cum Def Diff	Serv Cost Diff
3%_750_70	3	0.00	0.20	0.20	0.07	0.01
3%_750_90	2	0.01	0.10	0.20	0.15	0.01
3%_650_70	2	0.02	0.10	0.20	0.29	0.02
3%_650_90	1	0.02	0.10	0.10	0.60	0.03
6.5%_650_90	1	0.04	0.00	0.30	1.45	0.03
6.5%_650_70	2	0.04	0.10	0.30	0.67	0.02
6.5%_750_90	3	0.03	0.20	0.30	0.34	0.01
6.5%_750_70	3	0.03	0.20	0.30	0.15	0.01
7%_650_90	0	0.05	0.00	0.20	1.23	0.02
7%_650_70	1	0.04	0.10	0.20	0.54	0.02
7%_750_90	2	0.02	0.10	0.20	0.27	0.01
7%_750_70	2	0.01	0.10	0.20	0.11	0.00
<b>Average</b>	<b>2</b>		<b>0.1</b>	<b>0.2</b>	<b>0.5</b>	<b>0.02</b>

**Table 10. Value for a \$400k loan**

Loan ID	Transactor	High Pay Ratio	
		Balance Consolidator	Revolver
3%_650_70	\$440	(\$80)	\$80
3%_650_90	\$400	(\$80)	\$40
3%_750_70	\$440	(\$40)	\$120
3%_750_90	\$440	(\$80)	\$80
6.5%_650_70	\$800	(\$280)	\$80
6.5%_650_90	\$680	(\$200)	\$40
6.5%_750_70	\$760	(\$200)	\$120
6.5%_750_90	\$720	(\$200)	\$120
7%_650_70	\$960	(\$400)	\$40
7%_650_90	\$800	(\$280)	\$0
7%_750_70	\$840	(\$320)	\$80
7%_750_90	\$800	(\$280)	\$80

## 12. Conclusion

Leveraging Experian's trended data combined with AD&Co's integrated modeling capability provides a multidimensional view of MSR valuation that moves beyond static metrics to reveal how dynamic borrower behavior fundamentally drives cash flows and risk.

Analyzing this synthetic portfolio powerfully illustrates this: While all MSRs are priced to the same 350 bps OAS—implying the same risk-adjusted return—they present very different risk profiles. 3% discount MSRs offer stable, long-duration return streams, reflected in higher prices, longer WAL, and low effective duration. In contrast, 7% premium MSRs offer volatile, short-duration returns, evidenced by lower prices, shorter WAL, and high negative effective duration.

Crucially, Experian's trended data enables us to segment and price consumer risk more granularly within coupon and credit score bands. It identifies higher-value, rate-resistant borrower segments (Transactors) with lower prepayment risk, and lower value segments (Balance Consolidators) with faster prepayments. This granular insight re-ranks the relative value of loans that appear identical under traditional underwriting.

Therefore, we conclude that effective MSR portfolio management requires both: 1) reliable, granular behavioral data to accurately forecast borrower actions, and 2) an analytical framework, like the one demonstrated, that translates those forecasts into explainable metrics—such as effective duration, IO multiple, and PV of servicing cost—which directly inform true risk-adjusted valuation and dictate precise hedging requirements.

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