An AI-based Analysis of Credit Risk Management & Outlook

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Corporate Advisor:
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Academic Sponsor:
Smith Enterprise Risk Consortium

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Meet the Team

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Acknowledgment

We would like to thank Google for supporting us throughout the project, and the results we achieved over the short 7 week period would not have been possible without their involvement.

We would like to specially thank Fuad Alam and Rikesh Patel for their continuous and hands-on involvement in our project, and their constant feedback and encouragement.

Finally, we want to thank our faculty advisor Dr. Clifford Rossi and the support of the Smith Enterprise Risk Consortium.

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Content

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Introduction

- Project Overview
- Objective
- Key areas of Focus

Project Overview

- **PURPOSE:** Explore the cutting-edge capabilities of Google Gemini to enhance the understanding of credit quality banks and fintech and identify credit quality trends.

- **METHODOLOGY:** Create a database of Call Reports, 10-Qs, and Earning Call Transcript, build an AI model to process and analyze and quantify these financial documents, while only using Python and Google’s free platform.

- **SIGNIFICANCE:** Integrating AI tools with traditional financial analysis creates an unprecedented opportunity to analyze more data, better quantify future sentiment outlook, and create a more complete analysis of a company's credit quality. The quantifiable outcome of our model can push more well-rounded data-driven decisions in less time.

Objectives

- Utilized artificial intelligence to extract consistent insights from executive statements and SEC fillings across banks and fintechs.
- Merge Quantitative and Qualitative aspects of a company statements to provide a comprehensive analysis of credit risk
- Identify if banks and fintechs portray credit quality differently in their external statements and understand the effects.
- Discern recent trends in credit performance and future outlook for banks and fintechs.

Key areas of Focus

Optimized AI Modeling:

Can the model provide reliable and structured insight?

Banks vs. Fintechs:

Are there measurable distinctions between how they communicate their credit risk and does this affect investment decisions?

Qualitative and Quantitative Integration:

How can we create added insights to companies by combining sentiment and numerical data?

Identify Trends:

Can the model identify trends and warning signs for the industry?

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Methodology

- Tools and Softwares Used
- Analytical Techniques

Tools and Software used

- **Python:** Central to our data manipulation and analysis. Leveraged Python's extensive libraries for robust data operations.
- **Google Gemini AI Suite:** Utilized for its advanced NLP capabilities, crucial for extracting insights from textual data in financial disclosures.
- **Google AI Studio:** Provided a powerful API for automating prompts and data extraction at scale.
- **Google Notebook LM:** Employed as an advanced notebook environment for interactive prompt development.

Analytical Techniques

NLP: Applied to parse and analyze textual data from financial disclosures and earnings calls. Techniques included sentiment analysis and keyword extraction to extract insights about credit risk and performance narratives.

Trend Analysis: Used several analytical techniques to identify trends in call report data to compare with sentiment and credit quality insights extracted from financial reports and Investor Call Transcripts.

Data Visualization: Used tools like Python's Matplotlib and Seaborn, and Google AI Studio for more dynamic visualizations, were key in visualizing findings.

Text Analytics: Employed Google's Gemini AI for deeper text analysis, focusing on uncovering subtle patterns in how credit quality is discussed in various documents.

Data Description

- Data Summary
- List of Banks
- List of Fintechs
- Sources of Data

Data Summary

40
BANKS

17
FIN TECHS

Time Period: Q1, Q2, Q3 of 2023 and 2024. To test our prompts, we used Q1 and Q2 of 2008 to identify whether distressed banks from the 2008 crisis were identified.

List of Banks

<$10 BILLION:

1. Amalgamated Financial Corp.
2. Bank of Hawaii Corporation
3. Bank of Marin Bancorp
4. Byline Bancorp, Inc.
5. Camden National Corp
6. First Financial Bancorp
7. Origin Bancorp, Inc.
8. SouthState Corporation
9. Washington Trust Bancorp Inc

$10-$100 BILLION :

1. BOK Financial Corporation
2. Comerica Inc
3. East West Bancorp Inc
4. First Horizon Corp
5. Pinnacle Financial Partners, Inc.
6. Prosperity Bancshares Inc
7. Synovus Financial Corp.
8. UMB Financial Corporation
9. Valley National Bancorp
10. Western Alliance Bancorporation
11. Zions Bancorporation, National Association

List of Banks

$100 - $250 BILLION :

1. Citizens Financial Group, Inc.
2. Discover Financial Services
3. Fifth Third Bancorp
4. Flagstar Financial Inc (NY Community)
5. Huntington Bancshares Incorporated
6. KeyCorp
7. M&T Bank Corp
8. Northern Trust Corp
9. Regions Financial Corporation
10. Synchrony Financial

>$250 BILLION :

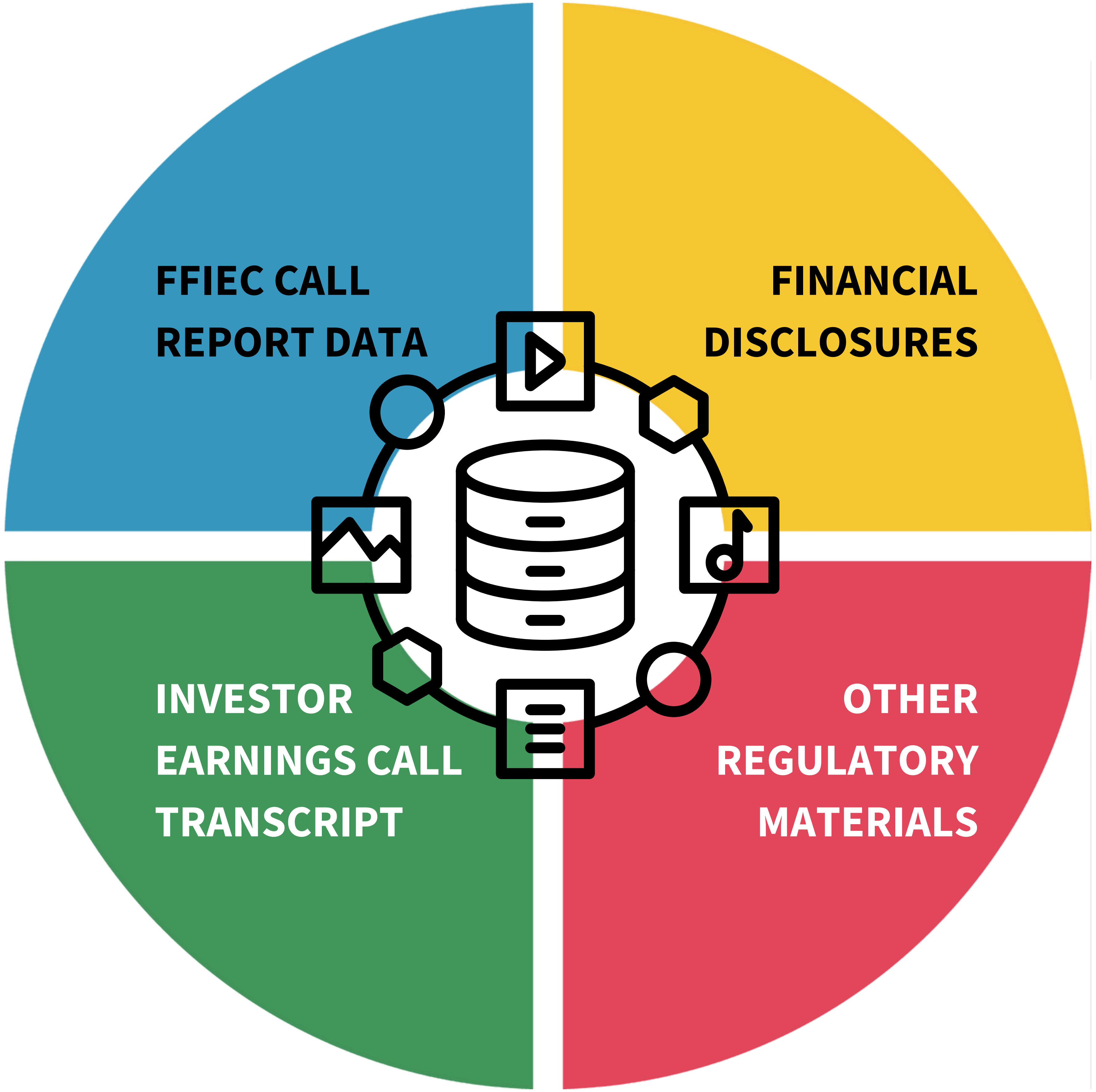
1. Capital One Financial Corp
2. Citigroup Inc.
3. Goldman Sachs Group Inc
4. JPMorgan Chase & Co.
5. Morgan Stanley
6. PNC Financial Services Group Inc
7. Truist Financial Corporation
8. U.S. Bancorp
9. Wells Fargo & Company

List of Fintechs

- Affirm Holdings Inc.
- Bread Financial Holdings Inc.
- Consumer Portfolio Services, Inc.
- Enova International, Inc.
- Finance of America Companies Inc.
- Medallion Financial Corp.
- Navient Corporation
- OppFi Inc.

- Oportun Financial Corporation
- PRA Group, Inc.
- PayPal Holdings, Inc.
- Regional Management Corp.
- Sezzle Inc.
- SoFi Technologies, Inc.
- Upstart Holdings, Inc.
- World Acceptance Corporation

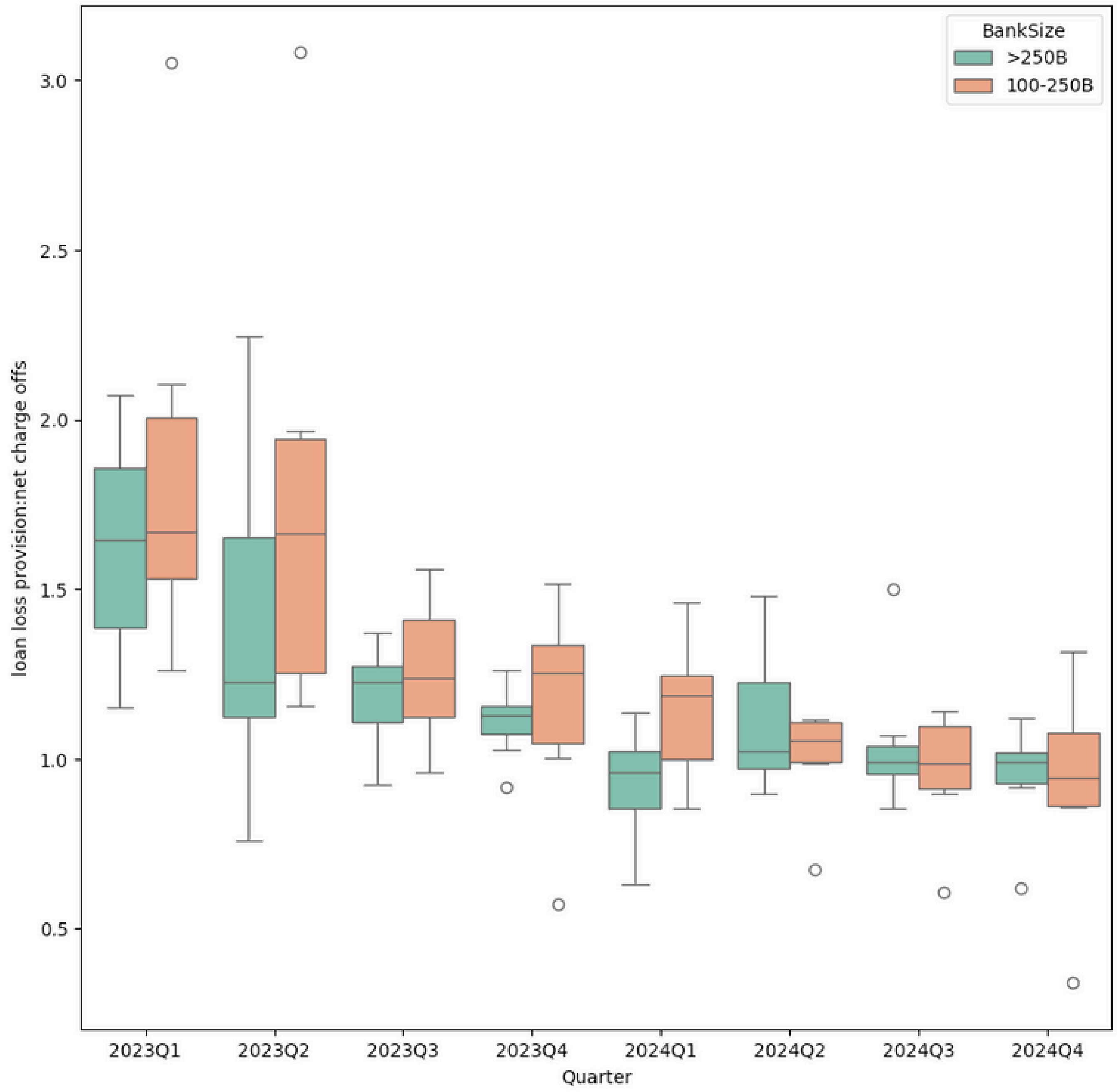
Sources of Data



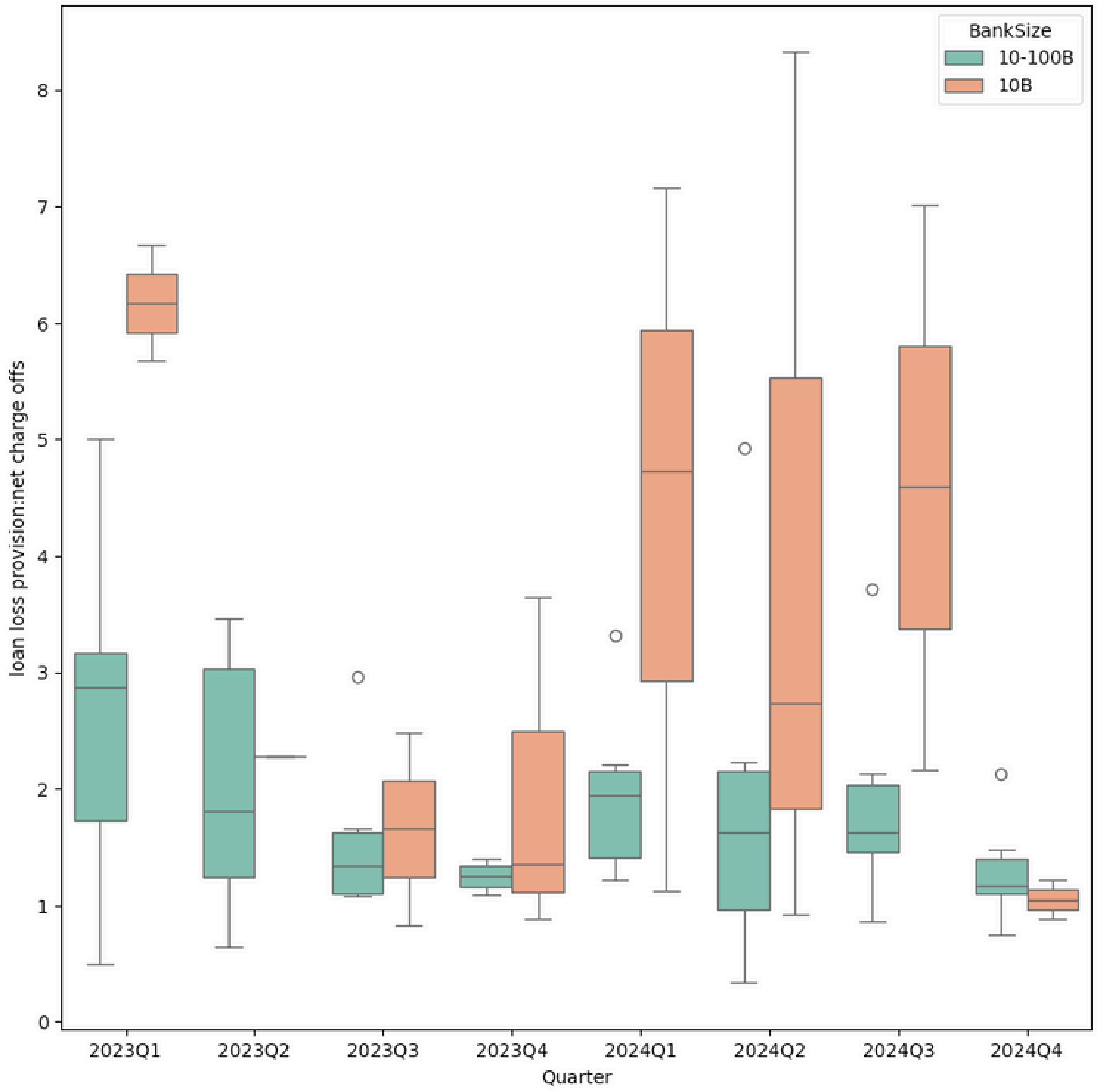
Call Report Trends

ACL Provisions/Net Charge Offs

Top 2 Buckets



Bottom 2 Buckets



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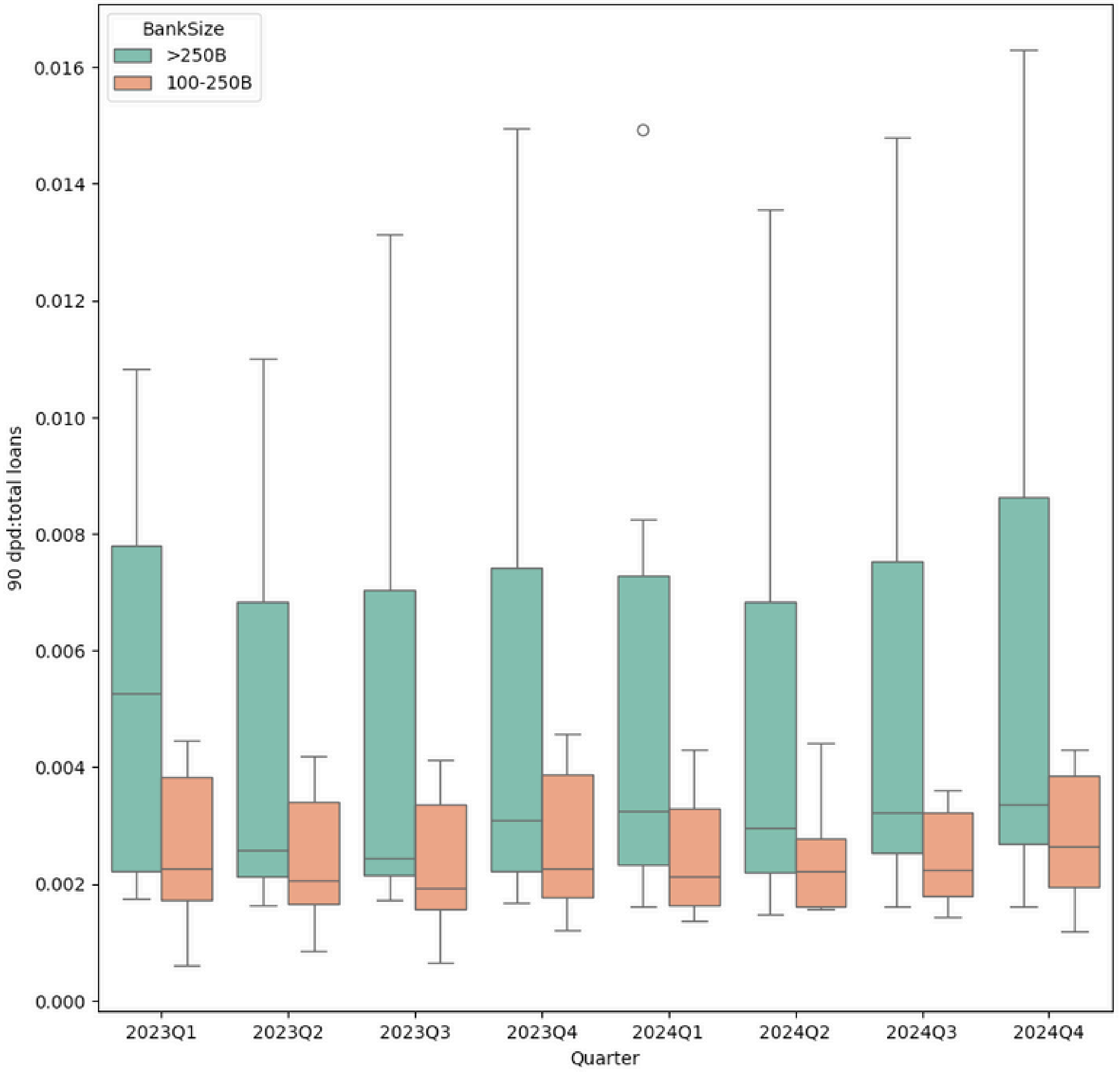
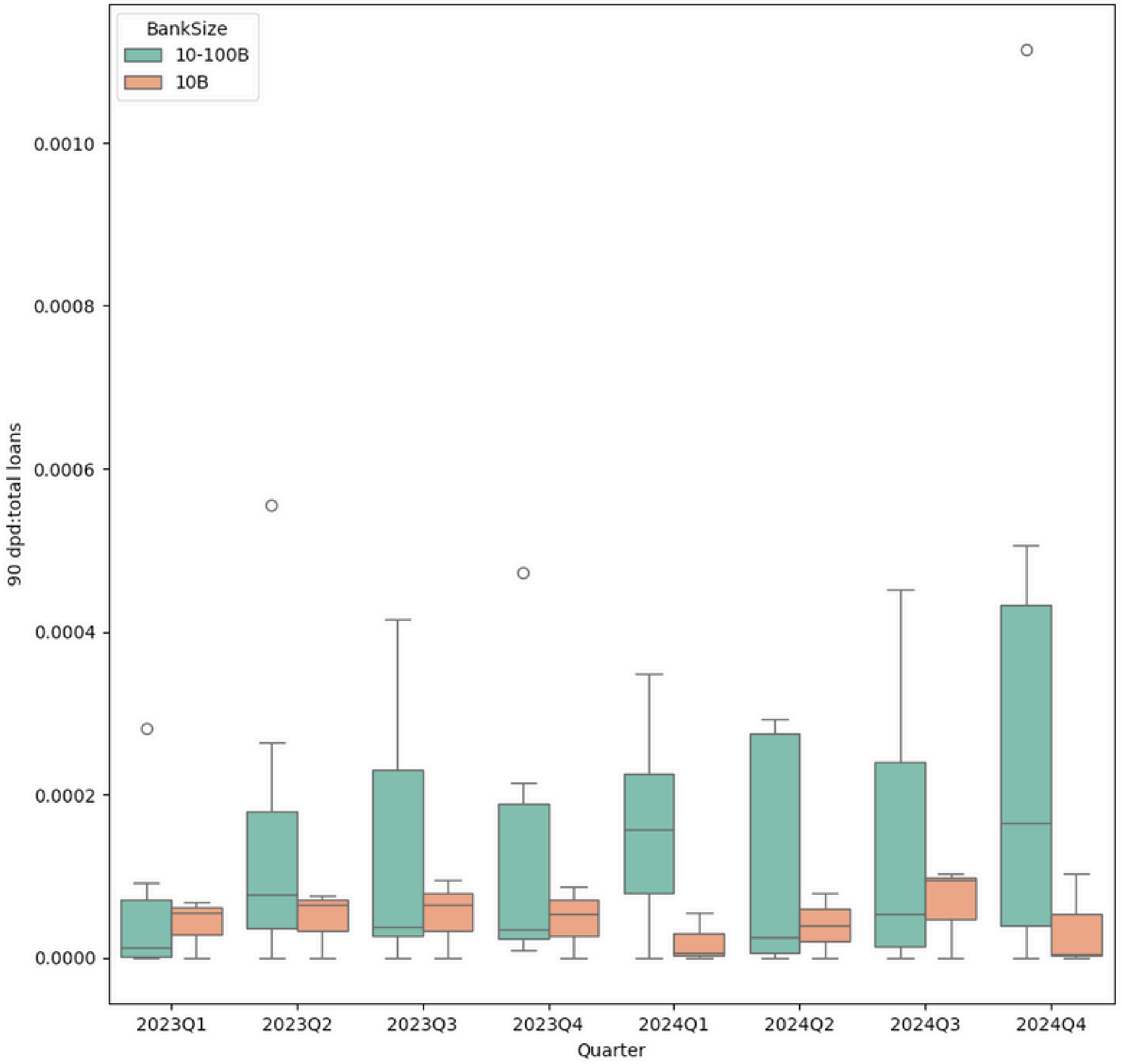
Serious Delinquencies (90DPD+)

Top 2 Buckets



Bottom 2 Buckets



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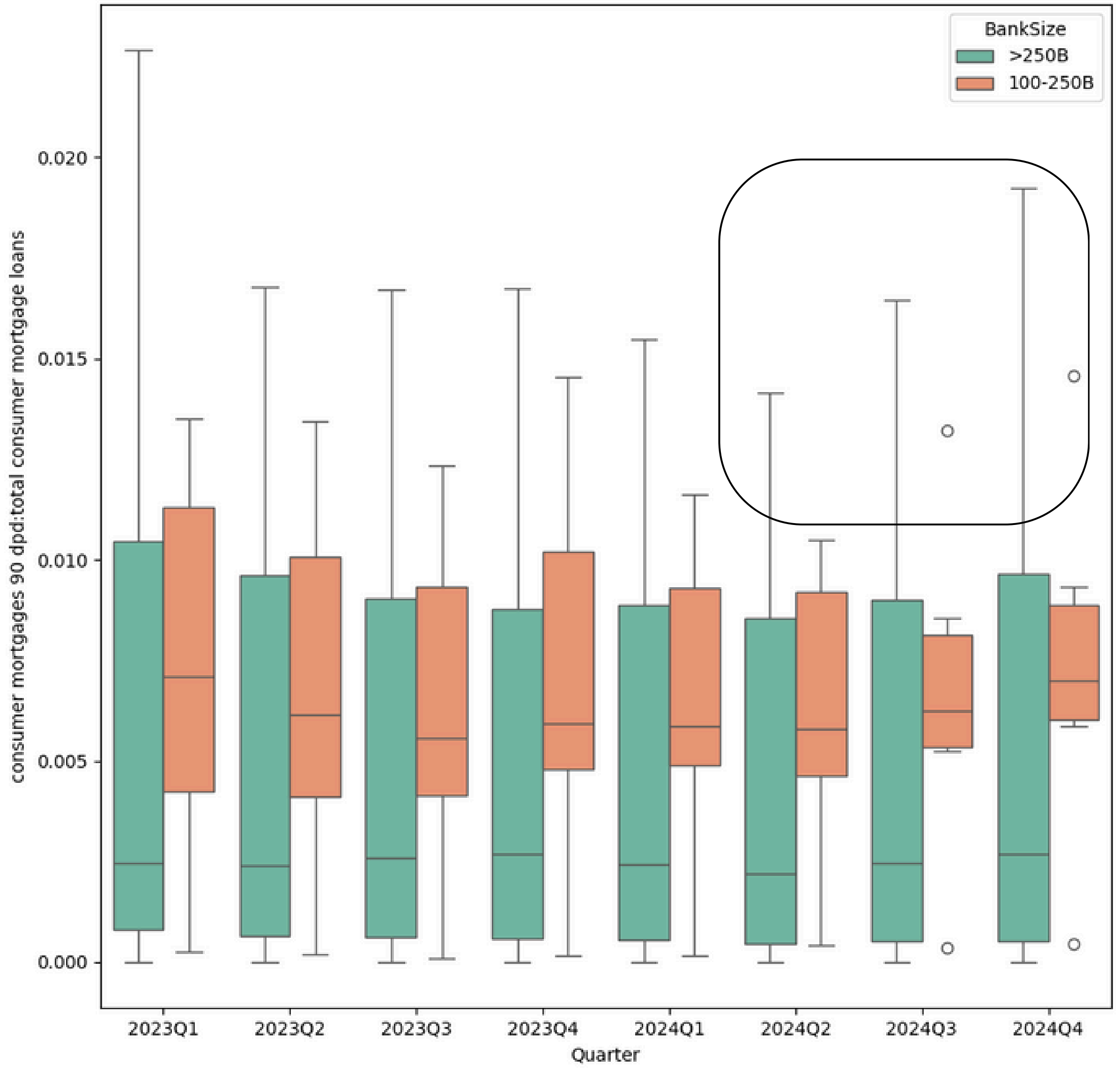
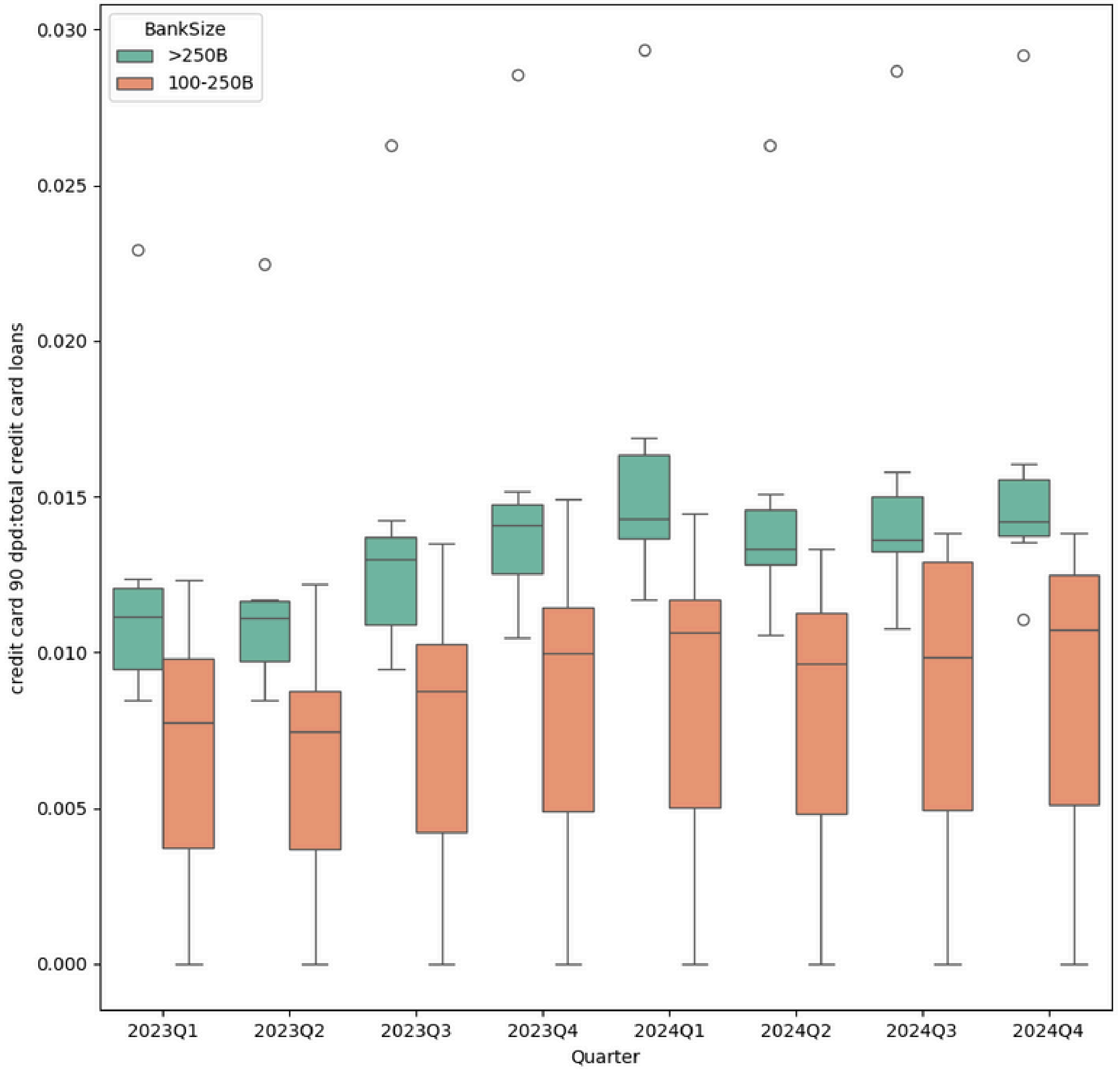
Consumer Portfolios

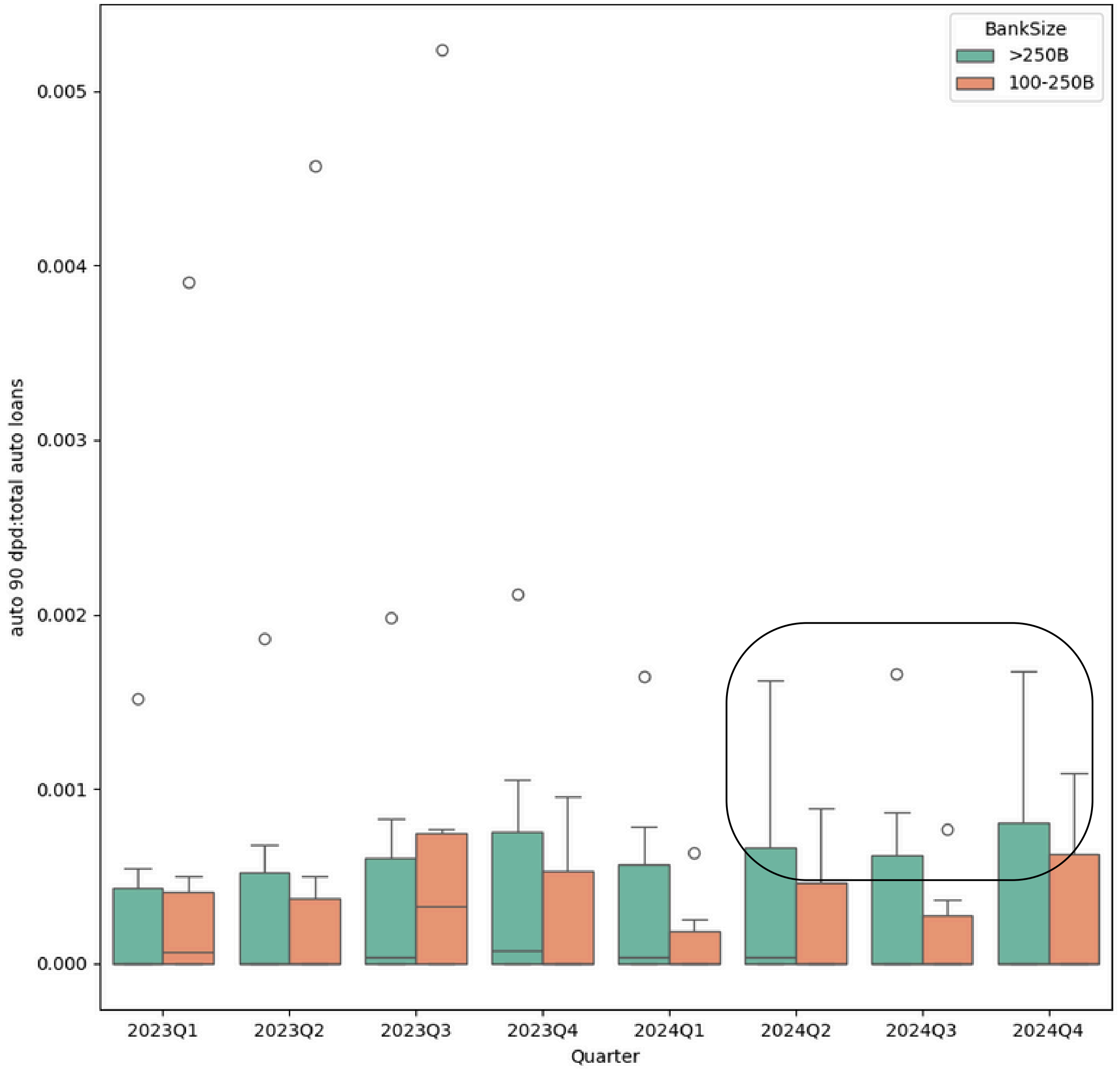
Mortgages



Credit Cards



Auto



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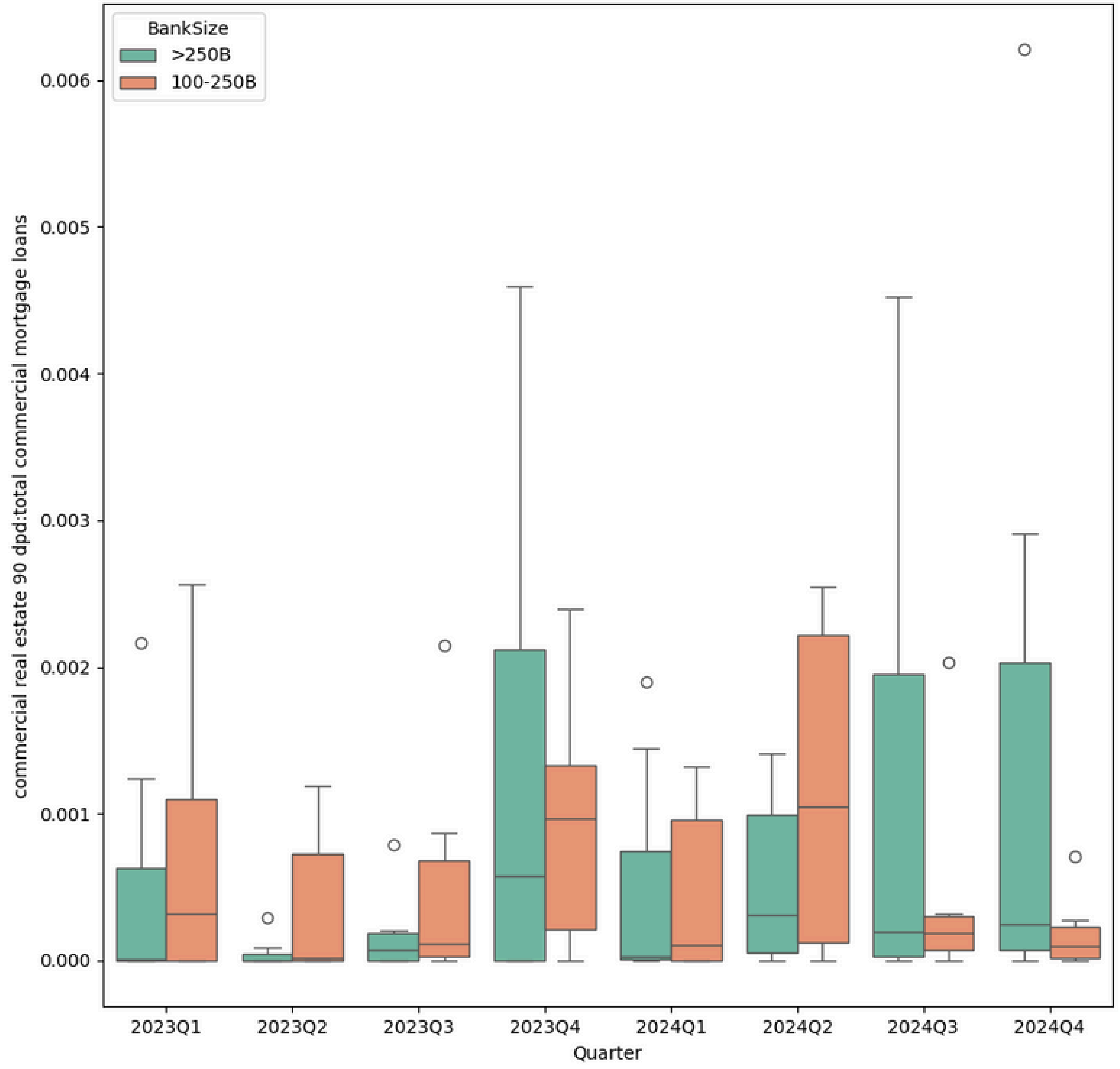
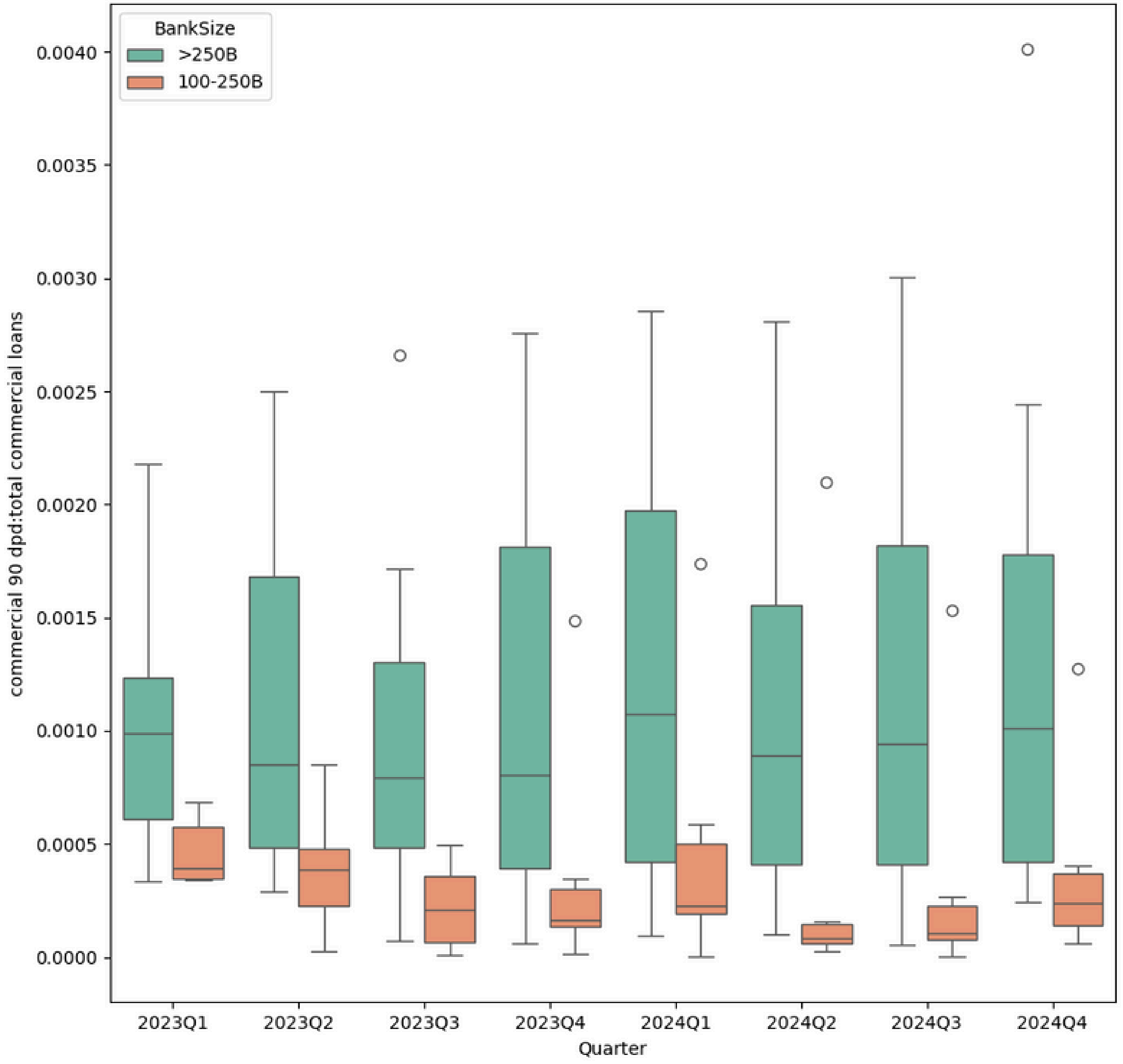
Commercial Portfolios

CRE



C&I



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Summary

- ACL Provisions/NCOs have been decreasing since Q1 2023. Smaller banks exhibit higher ratios and are more volatile as compared to the larger banks
- Smaller banks have much lower rates of serious delinquencies as compared to the larger banks
- Serious delinquency rates, especially at the higher end of the distributions have been increasing over the last three quarters.
- Credit quality seems to be bearish on consumer portfolios as seen by rising delinquencies across all three consumer porfolios - mortgages, credit cards and auto loans
- Commercial Real Estate (CRE) portfolios have faced much higher delinquency rates especially for the largest banks.
- Delinquencies in C&I loans have been stable through the 8 quarters.

Banks

- Credit Risk Management Effectiveness
- Credit Risk Outlook

Prompt Development

Scoring Categories

- Credit Culture & Governance
- Credit Risk Identification & Assessment
- Credit Risk Mitigation
- Credit Risk Monitoring & Control
- Loss Provisioning & Capital Adequacy

Prompt Development - Utilised Gemini and NotebookLM.
We asked Gemini to identify sections of the report that mention credit management, identify key categories that describe credit quality, and iteratively developed a detailed prompt to extract relevant data.

Credit Risk Management Effectiveness

- Prompt Automation: We passed each bank's 10-Q and Earnings Call Transcript together through our prompt, and iterated the same prompt over each of our 40 banks using AI Studio's API to score their credit risk quality.
- Structured Analysis: We scored each bank based on 5 key metrics on a scale of 1-5, with 5 reflecting the highest quality of credit risk management.
- Final Score: Each category is assigned equal weight to ensure a balanced assessment of the overall credit quality.

Consistency of Outputs

We ran 3 separate prompts on the same subset of documents 3 different times to compare the accuracy of outputs.
Prompt 3 was the **most reliable and consistent**, with accurate outcomes 39% of the time.
It demonstrated **perfect agreement across all 3 trials**, which is the **most conservative approach.**

ACCURACY RATE				
	Scorecard			
Category	1	2	3	Total
<10	22.22%	33.33%	27.78%	27.78%
10-100	16.67%	0.00%	41.67%	19.44%
100-250	27.78%	22.22%	33.33%	27.78%
>250	22.22%	22.22%	72.22%	**38.89%**
Fintech	16.67%	25.00%	8.33%	16.67%
Total	21.11%	18.89%	**38.89%**	26.30%

2008 Crisis - Proof of Concept

We ran our prompt on 8 banks using their investor calls and 10Qs from 2008 Q1 and 2008 Q2.

It predicted:

- US Bank, JP Morgan, and Well Fargo to have good credit quality
- Bank of America had poor credit quality
- Citi, Washington Mutual, Wachovia, and IndyMac to be distressed banks on the verge of collapse.

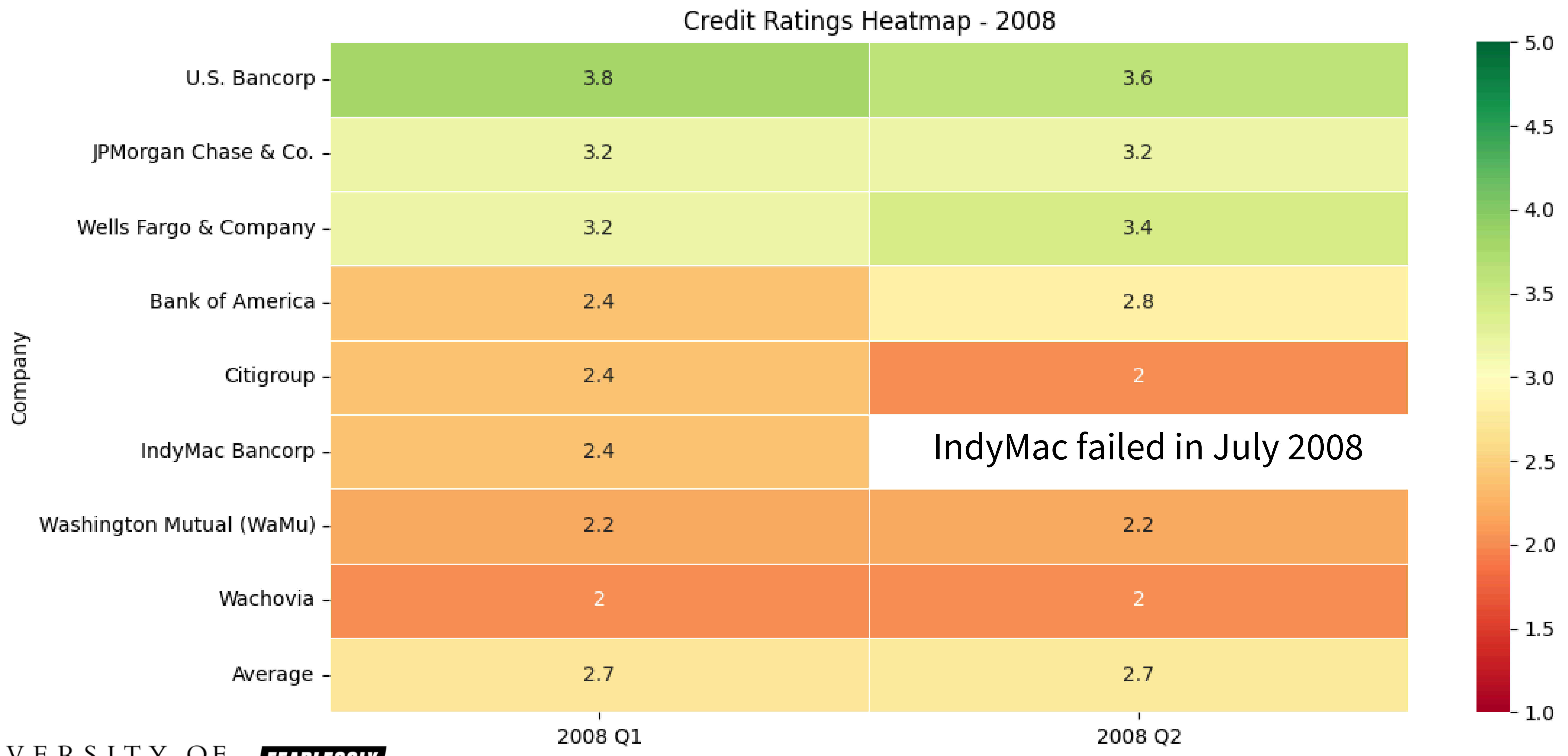
This categorization gave us confidence in the model's ability to identify distressed and well-performing banks.

2008 Crisis - Outcome

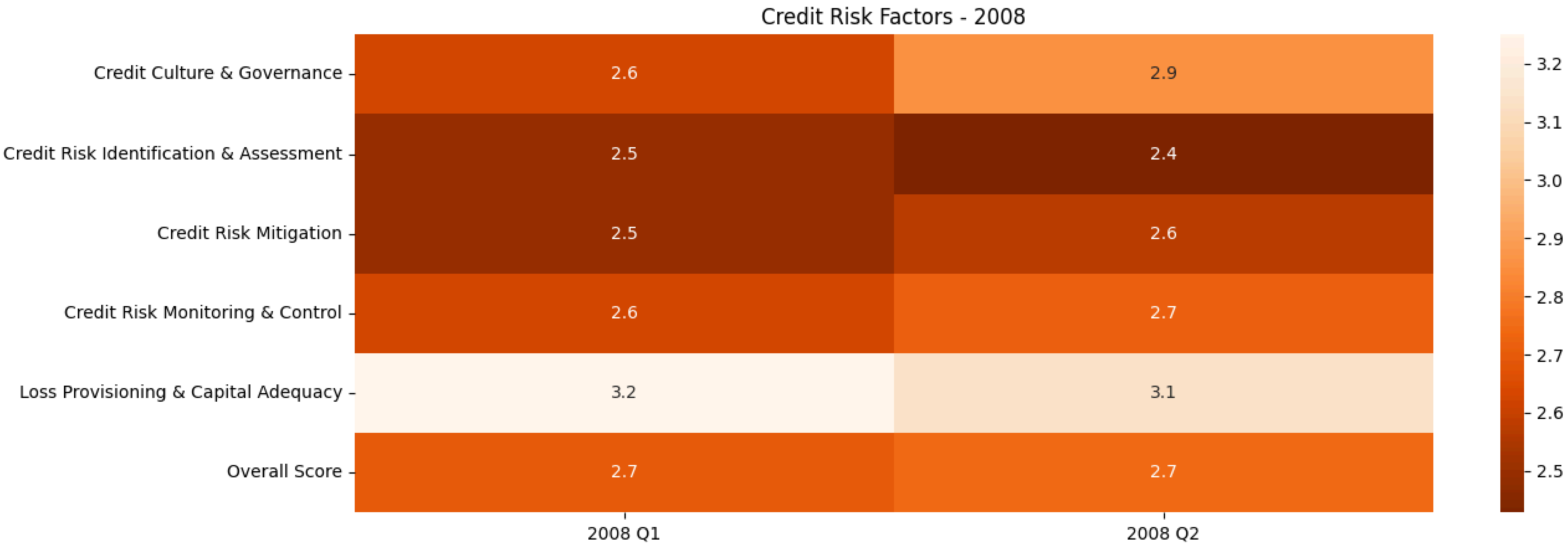
2008 Financial Crisis - Average Score by Quarter			
Non-failed Banks, Q1	**Near Failure/Failed Banks, Q1**	**Non-failed Banks, Q2**	**Near Failure/Failed Banks, Q2**
US Bancorp JP Morgan Wells Fargo Bank of America	IndyMac Wachovia Washington Mutual CitiGroup	US Bancorp JP Morgan Wells Fargo Bank of America	IndyMac Wachovia Washington Mutual CitiGroup
3.15	2.25	3.25	2.07

We average our model's scores by bank outcomes in 2008 and see a clear distinction between the banks that survived, and those that either failed or were on the brink of failure.

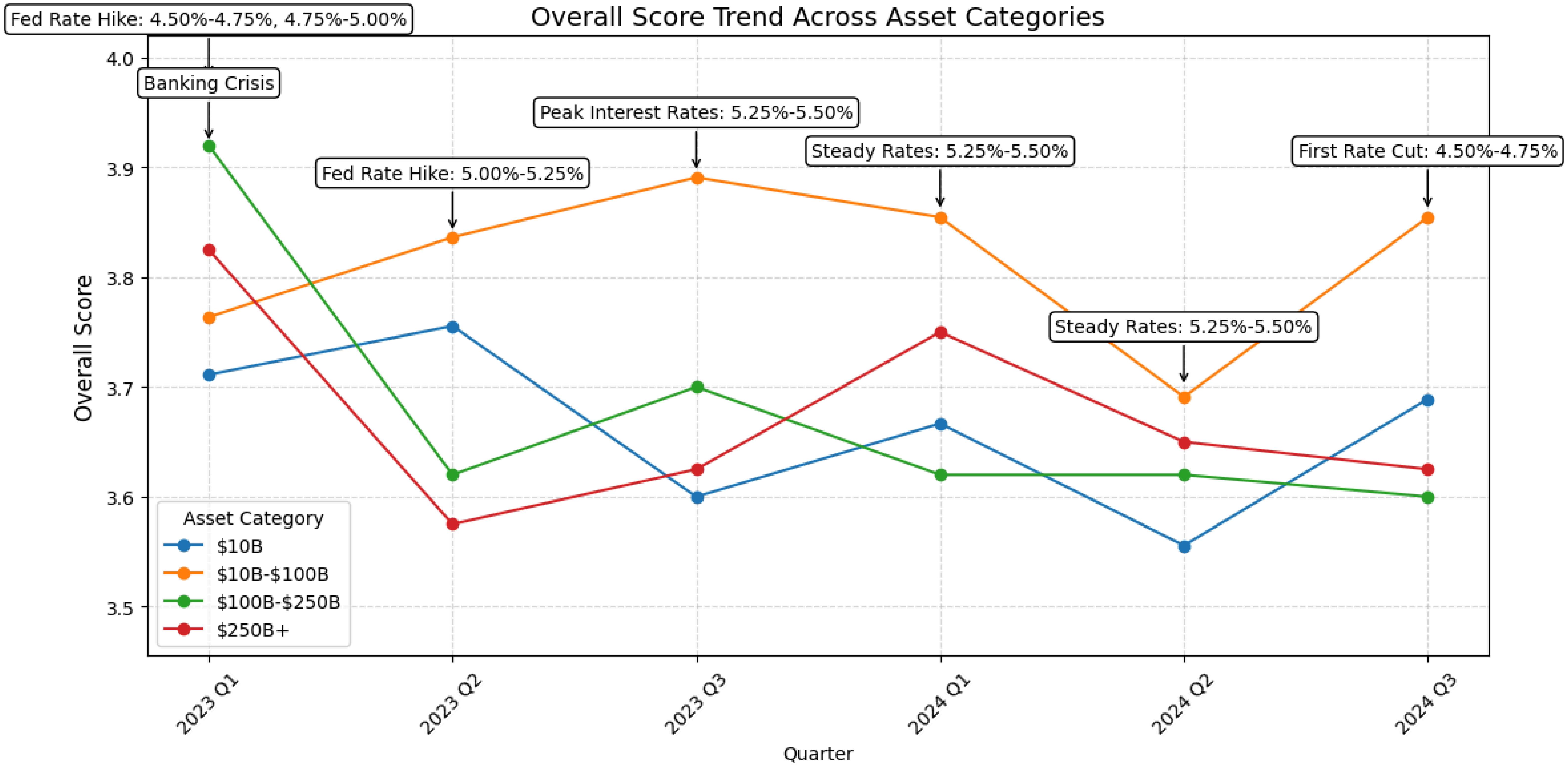
Credit Quality - 2008



Credit Factors - 2008



Credit Risk Management Effectiveness Trends



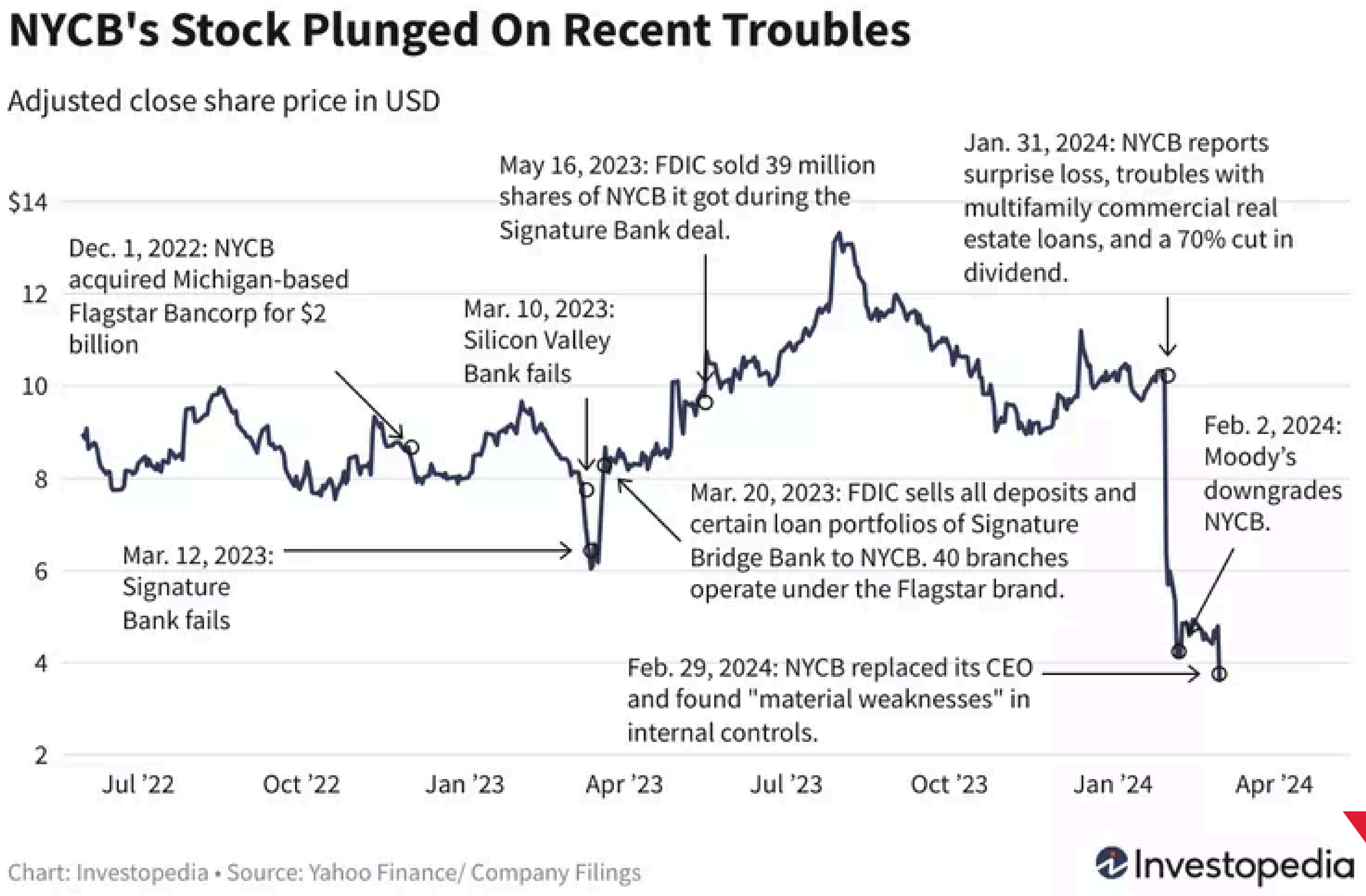
Credit Risk Management Effectiveness Insights

- Credit risk management effectiveness score has been declining in general from Q1 2023 to Q2 2024.
- Banks in the $100-$250 Billion category had the worst ratings from Q1 2023 to Q3 2024, and the worst credit sentiment over the same period.
- The steep drop in mid-2023 for large and mid-sized banks suggests an external shock (interest rate hikes).
- A general trend in declining credit outlook aligns with rising delinquencies and declining Loan Loss Provision/NCO ratios.
- Credit risk mitigation is the worst-performing subcategory over this time period for all the asset classes.
- The best-performing banks (highest overall scores) are those in the $10B - $100B range. They consistently maintain the highest scores and show resilience.

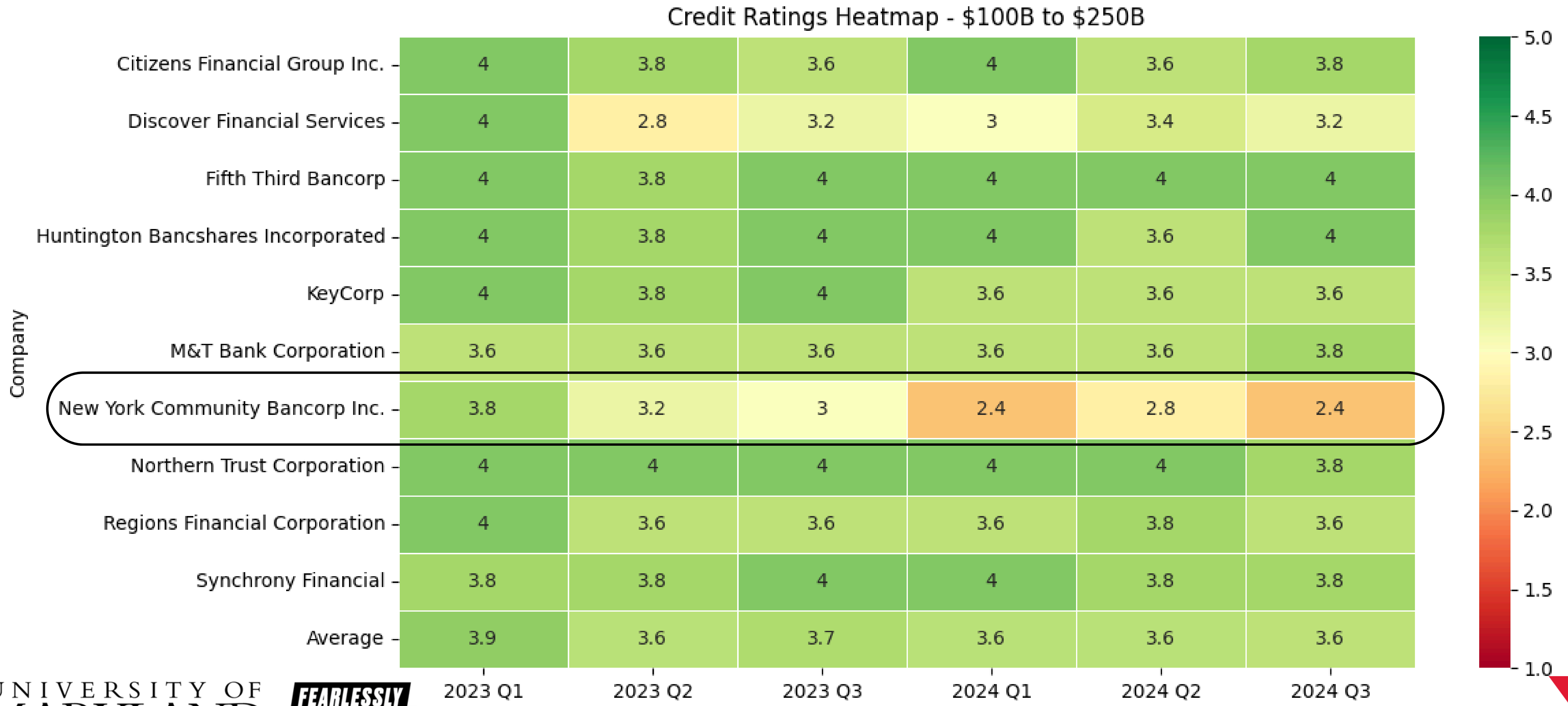
New York Community Bank

July 12, 2024: The reverse stock split became effective.

October 28, 2024: New York Community Bancorp is now officially Flagstar Financial.



Credit Quality - $100B to $250B



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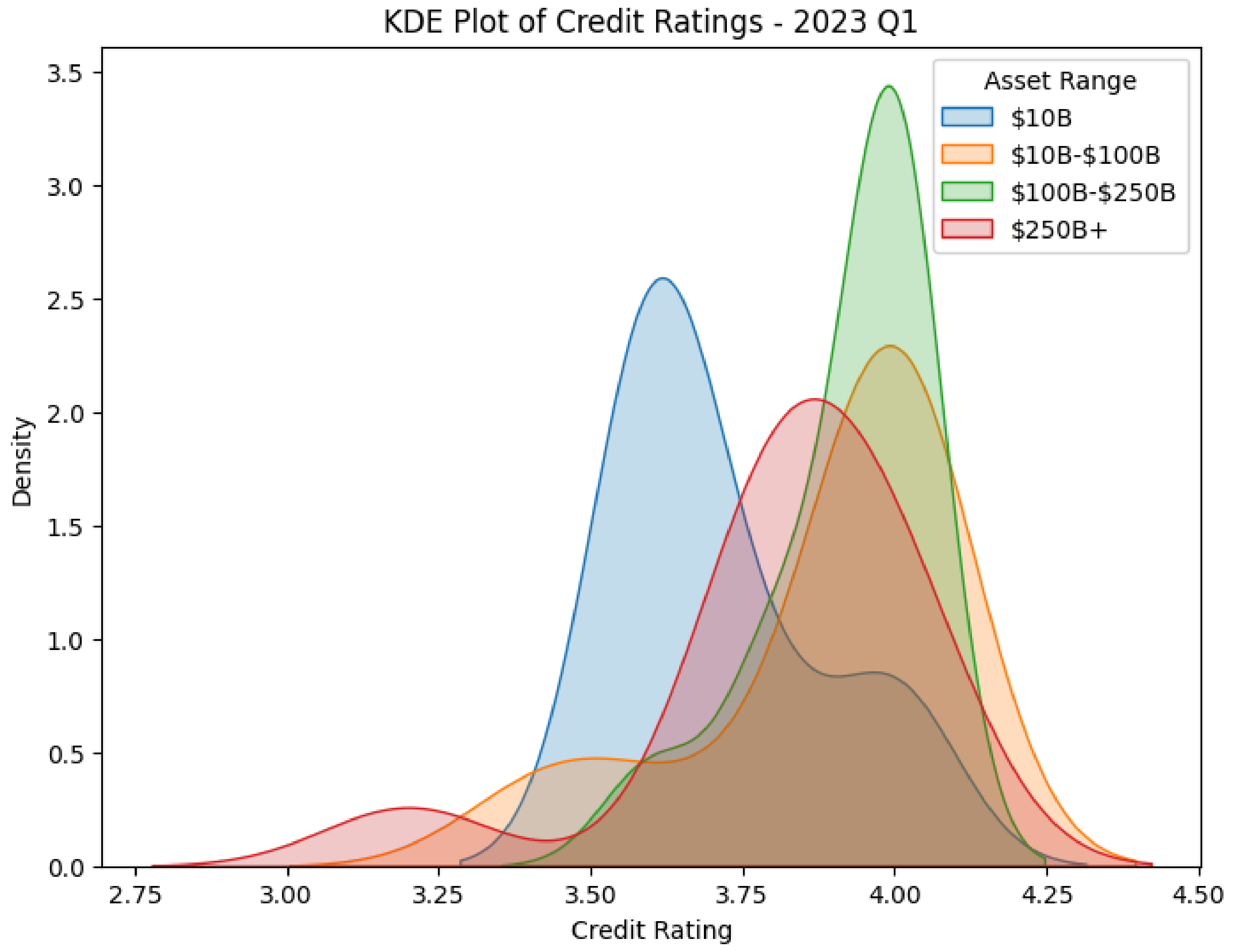
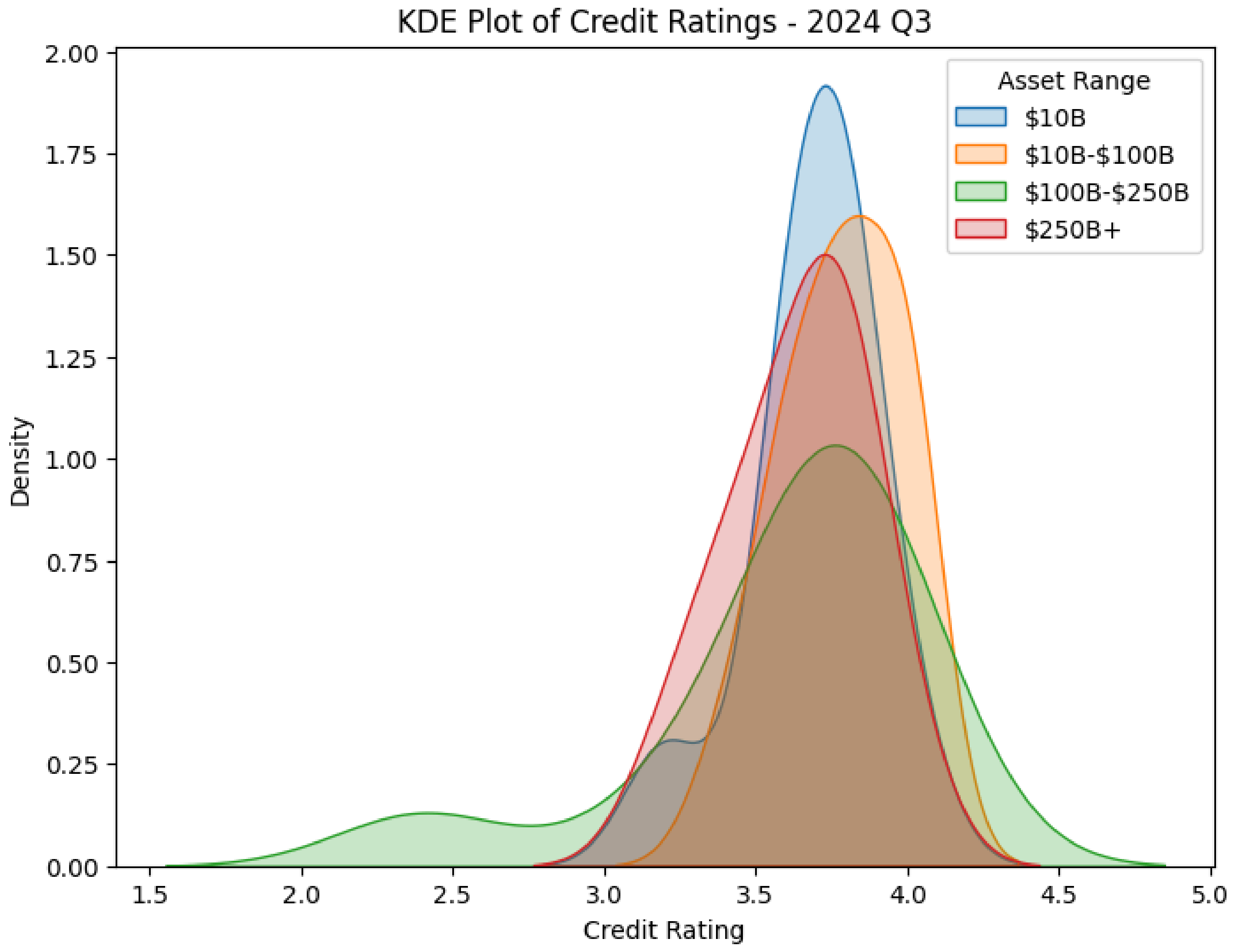
KDE Plot Insights





Banks across all categories had more stable and concentrated ratings in early 2023, which became more variable in 2024, signaling possible risk divergence.

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Credit Risk Outlook

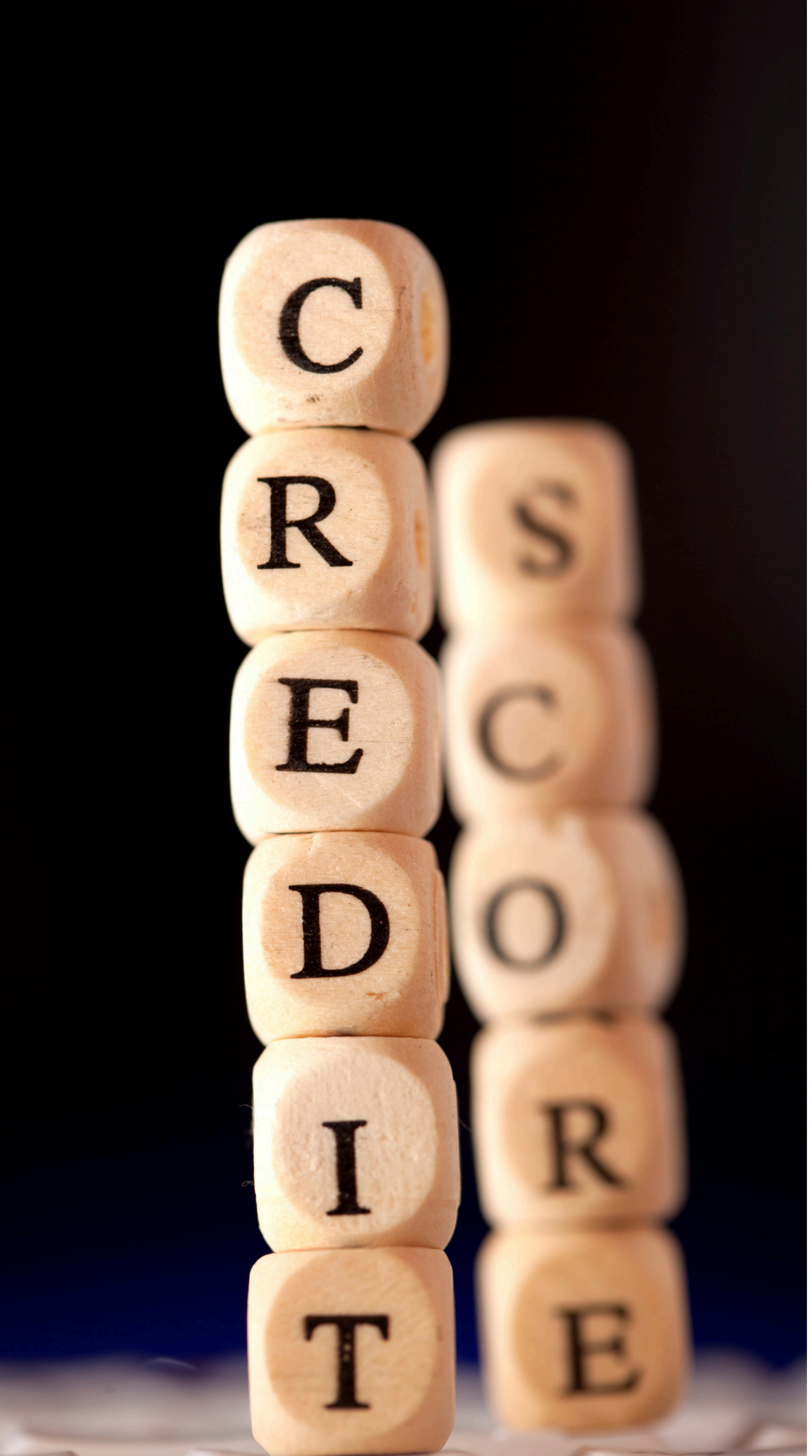
- Automated Transcript Processing: Scans investor transcripts from quarterly reports and utilizes an AI model to extract credit sentiment by analyzing predefined keywords within 16 key risk buckets.
- Structured Sentiment Analysis: Each bucket is rated on a 1–5 scale based on qualitative cues (e.g., retail banking, risk & compliance, mortgages), with specific weights assigned to reflect their impact on overall credit outlook.
- Dynamic Weighting & Final Rating: Buckets with insufficient data are skipped and their weights are proportionally reallocated, culminating in a single weighted average score alongside a summarized rationale.

Bucket Weightage Breakdown & Final Output Overview

- **Keyword Strategy**: Uses targeted sentiment indicators and contextual synonyms capturing terms like "strong," "robust," and "declining" alongside industry-specific terminology (e.g., "loan origination," "delinquency rates") to dynamically assess each bucket's risk profile based on transcript evidence.
- **Credit Outlook Role (Bucket)**: Serves as a macroeconomic integrator by considering factors such as interest rate policy, inflation, GDP growth, and unemployment trends, thus driving the final weighted rating and linking sector-specific insights to overall market conditions.
- **Quarter-to-Quarter Impact**: As seen in the table below, Flagstar's sentiment rating declined in IC Q3 2023, which in turn led to a lower credit rating in IC Q4 2023, highlighting how the model integrates shifts in sentiment to adjust future credit ratings dynamically.

Metric	IC Q1 23	IC Q2 23	IC Q3 23	IC Q4 23	IC Q1 24
Flagstar Sentiment	3.700000	3.330000	2.720000	2.940000	2.700000
Flagstar Credit Rating	3.800000	3.200000	3.000000	2.400000	2.800000

Buckets	Weights
Retail & Commercial Banking	7.90%
Securitized & Structured Credit	4.40%
Auto Lending	3.50%
Risk & Compliance	8.80%
Consumer Real Estate Lending	8.80%
Industrial Real Estate Lending	3.50%
Government & Institutional Lending	3.50%
Home Equity Loans & HELOCs	3.50%
Multifamily Real Estate Loans	5.30%
Commercial Real Estate	7.00%
Workout & Recovery Effectiveness	5.30%
Portfolio Quality Management	9.60%
Underwriting Standards & Processes	9.60%
Provisioning & Impairment Management	7.90%
Mortgages	9.60%
Credit Outlook	8.80%



Scores with Explanations

The outputs generate explanations for every score so we can easily dive deeper and explore the reasoning behind any insights we find.

Citi Q4 2023: 3.08 - “Credit performance is expected to moderate with NCL rates in cards expected to rise. Economic uncertainty and geopolitical factors contribute to a balanced but cautious credit outlook.”

Citi Q4 2024: 1.80 - “Credit card losses are expected to be at the high end of the range. There are concerns over the potential impact of card late fee reduction and FX. Rising auto loan defaults and weakness in industrial real estate financing.”

Consistency of Outputs

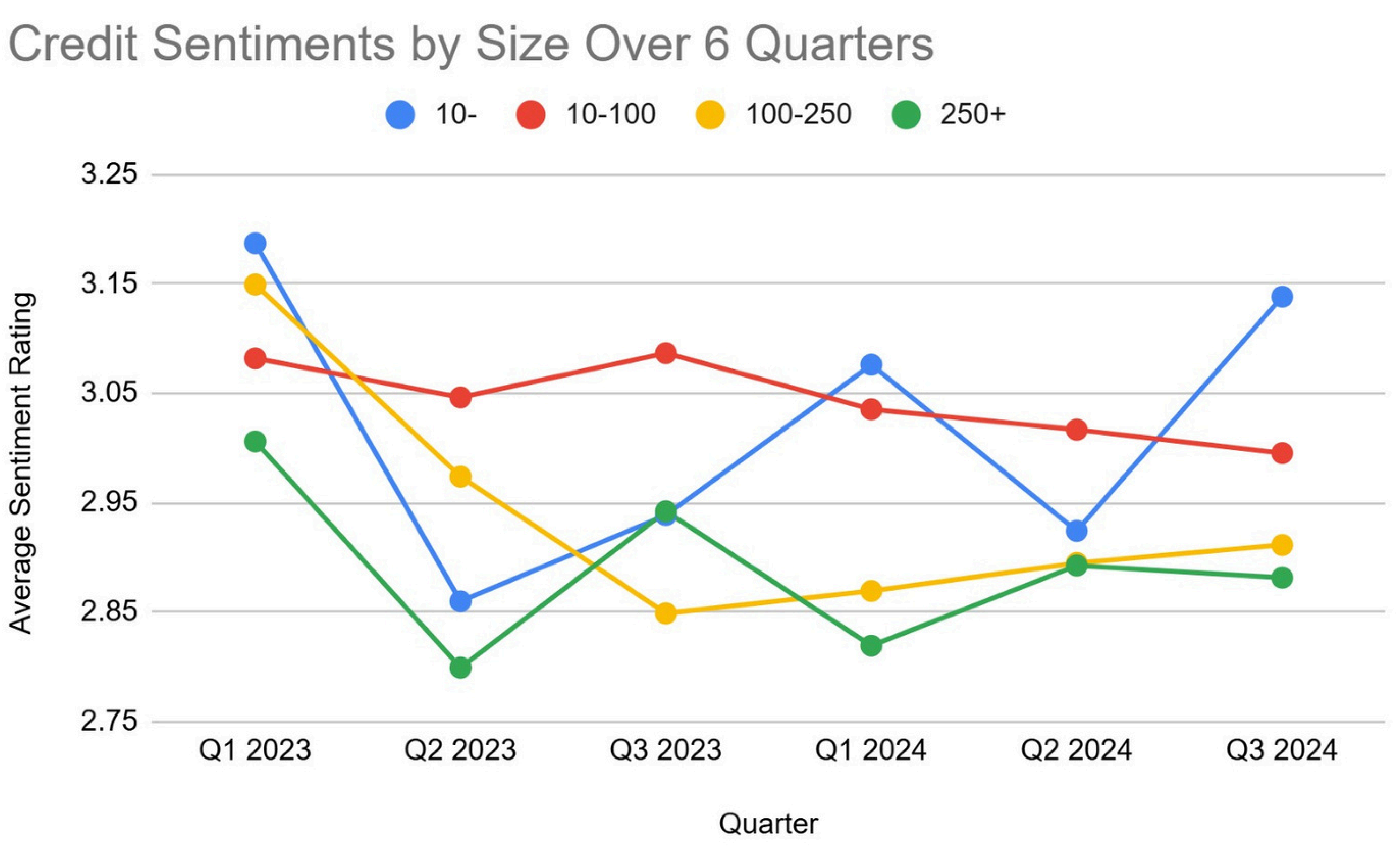
Expected output **standard deviation of 0.296** which is not bad, but shows how NLP models can give different outputs from the same input. Most extreme example below:

Camden Q4 2024: 3.88 - "The company demonstrates strong portfolio quality management and risk control, with proactive measures and early warning systems in place. The credit outlook is stable, with manageable delinquency rates and proactive loan modifications. However, there are some mixed signals in the commercial real estate segment … may moderately impact the bank's overall creditworthiness and stability over the next 12-18 months."

Camden Q4 2024: 1.68 - "Camden National faces significant risks driven by weak credit fundamentals, regulatory concerns, and a challenging interest rate environment. Deteriorating borrower performance and stress in asset quality further undermine creditworthiness. These factors point to potential difficulties in maintaining credit health over the next 12-18 months."

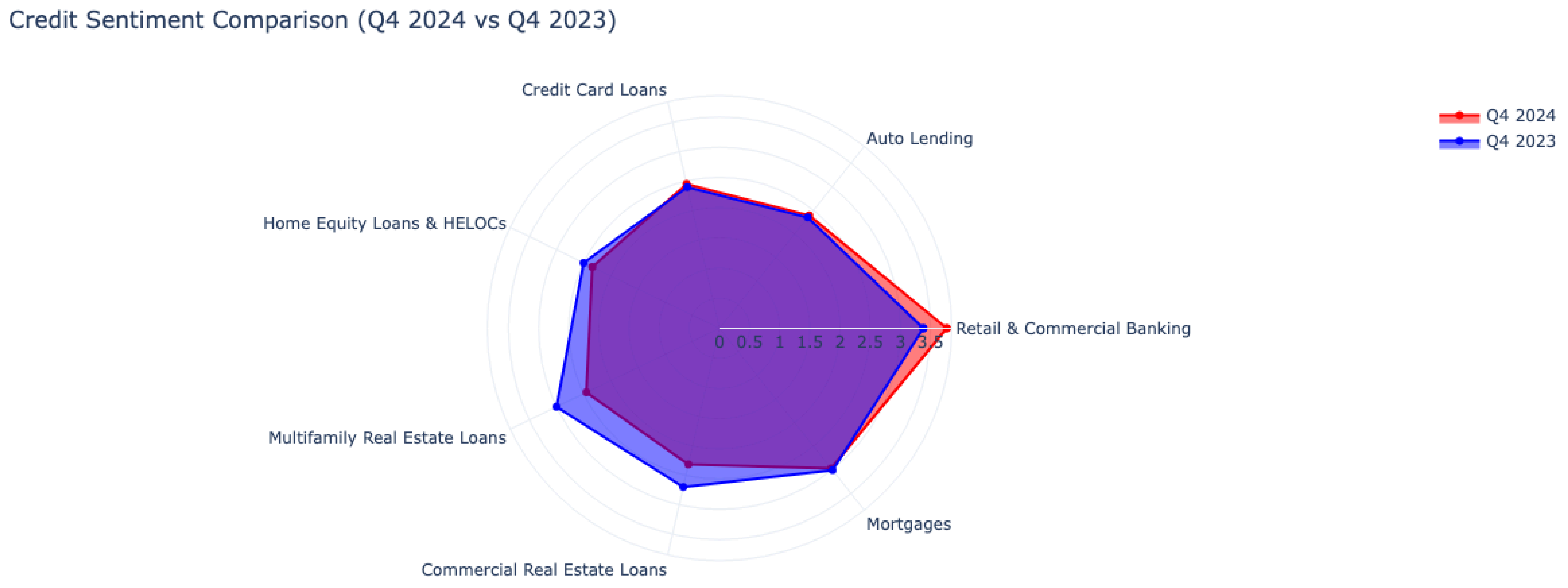
Findings

- Average sentiment ratings tend to converge close to 3
- Banks in the $250B+ size bucket generally have worse sentiments
- Q1 2023 saw higher mean sentiments for both 10Qs and Investor Calls



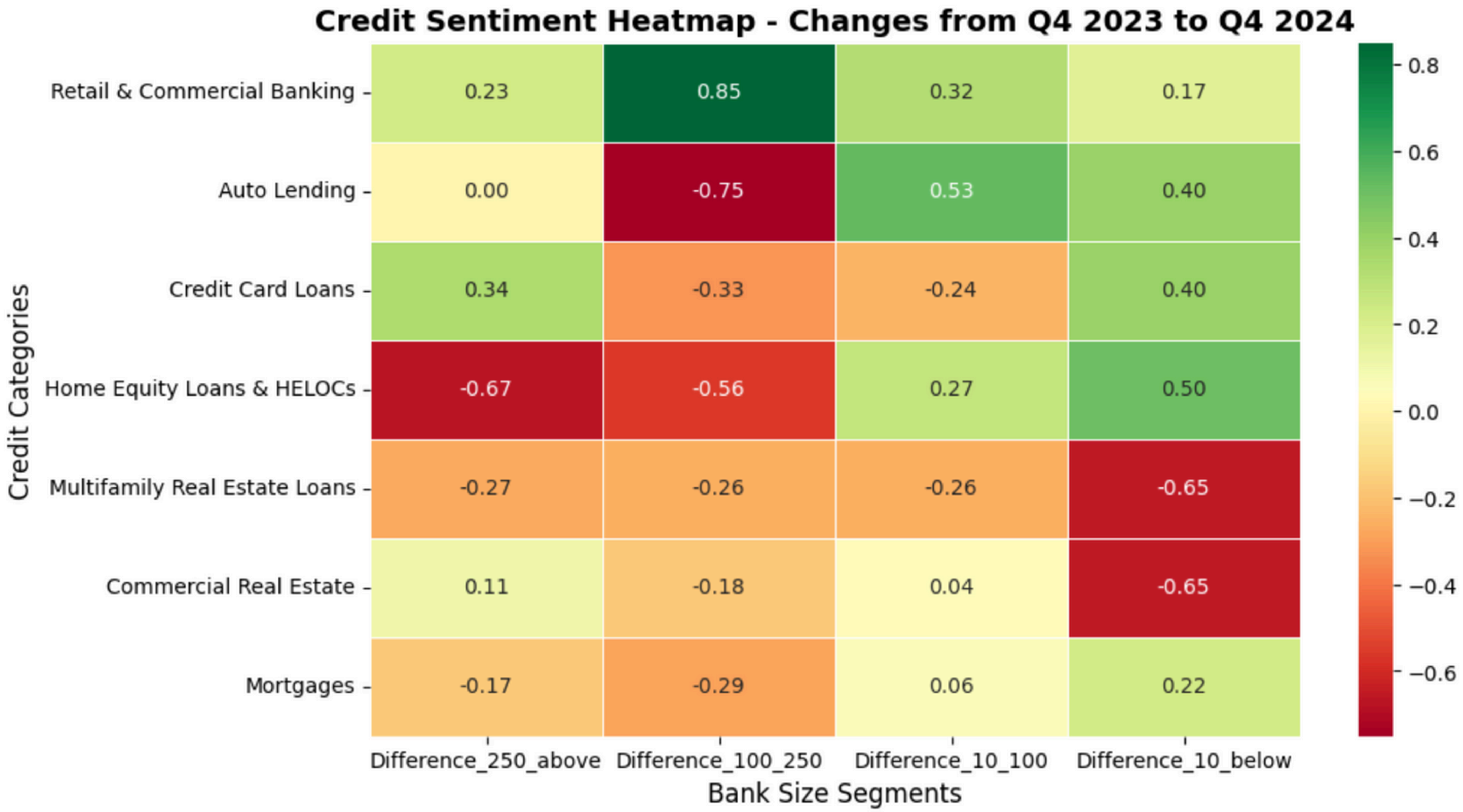
Findings

- Multifamily real estate and commercial real estate portfolios have shown a negative sentiment shift relative to 2023, a trend similarly observed in Home equity lines of credit, HELOCs.
- Overall, the graph shows that while retail and commercial banking sentiment is improving, real estate loans especially multifamily and commercial remain a concern. This calls for adjusting credit strategies to mitigate risks while leveraging strengths in other areas.



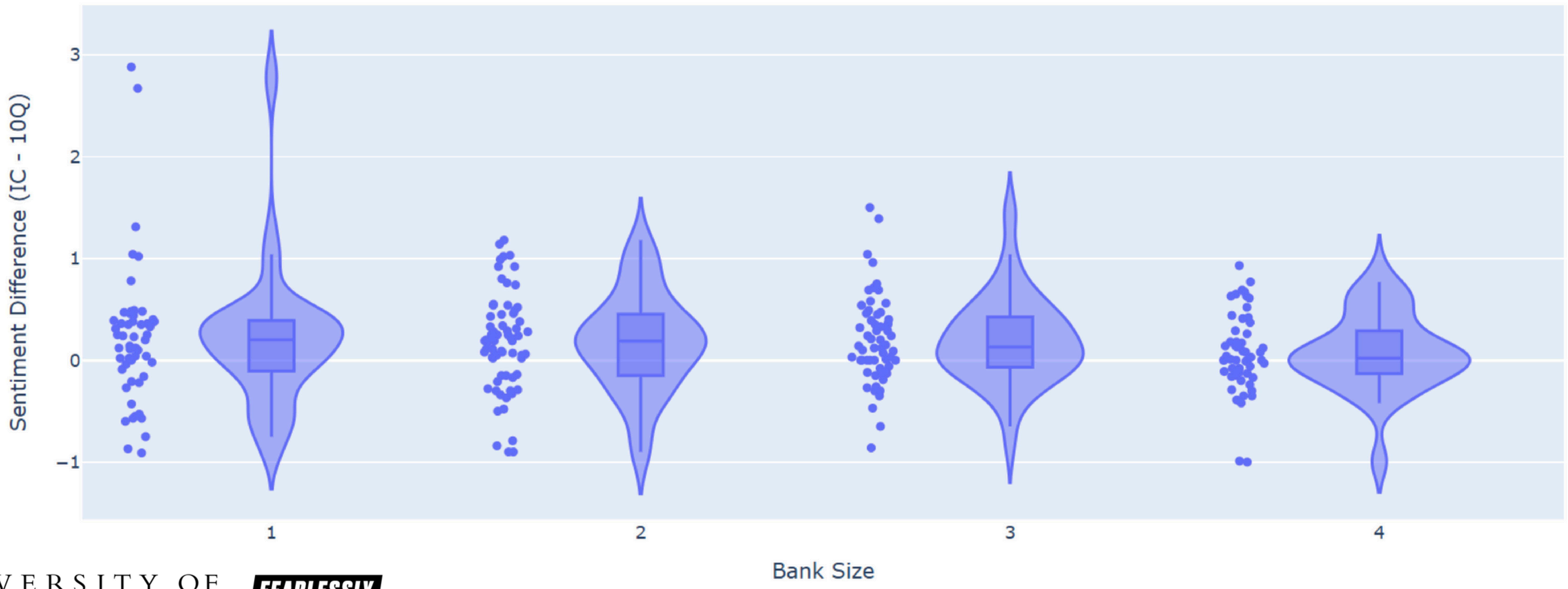
Findings

- Banks in the \$100B–\$250B size bracket are underperforming, with a pronounced decline in market sentiment.
- Multifamily and commercial real estate sectors exhibit the most adverse sentiment across all bank sizes.



Variation Between IC and 10Q Sentiments

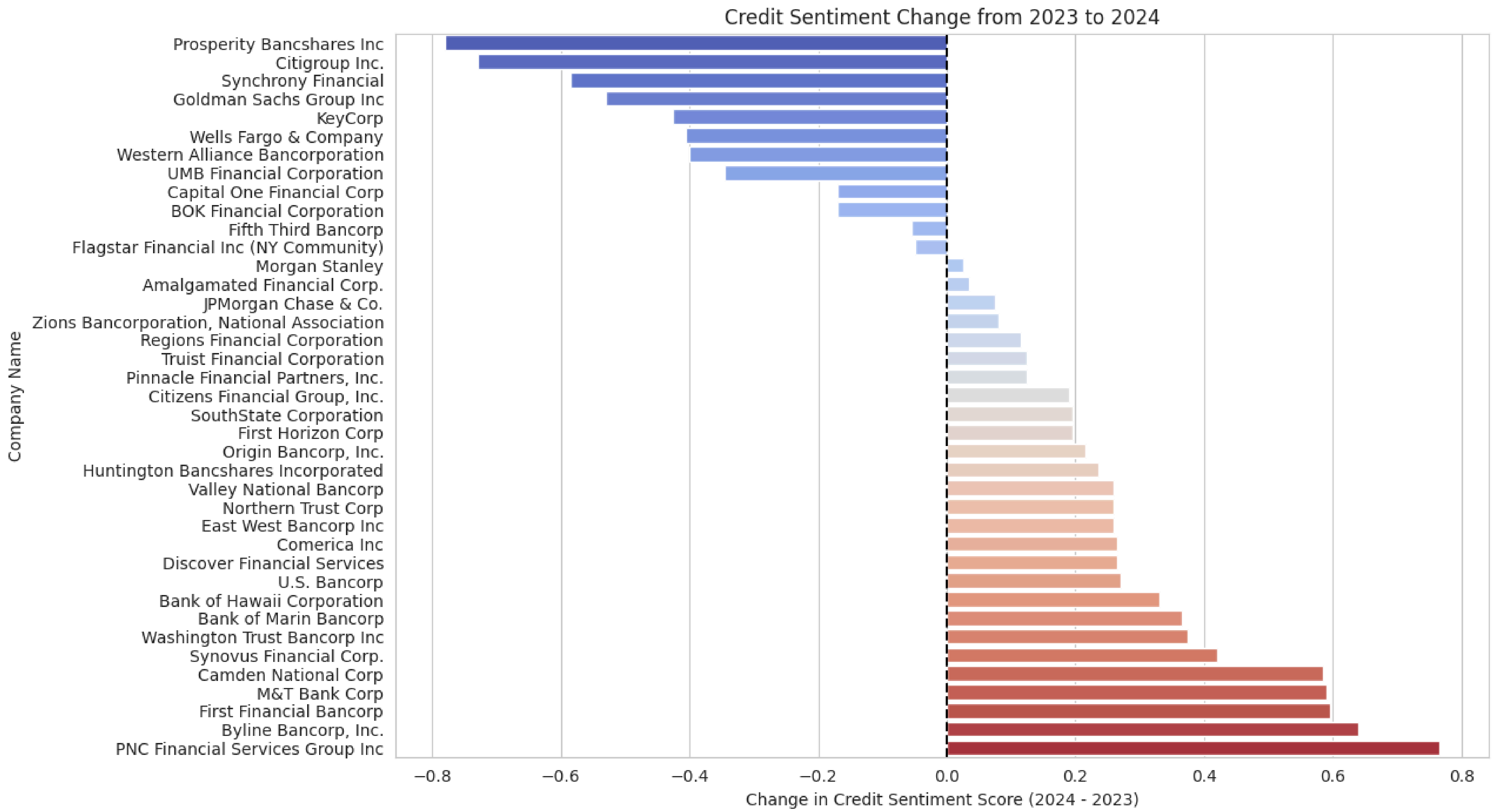
The chart below displays the dispersion of ratings between the Investor Calls and the 10Q reports. Investor calls tend to be rated higher by about 0.2 for their sentiment. The average difference (IC - 10Q) was positive for all bank size groups all 6 quarters.



Why Are IC Sentiments More Positive?

- Tone & Language: ICs allow executives to control the narrative and sound optimistic
- Future Focus: ICs emphasize future growth and strategic initiatives
- Impact of Q&A: Management can downplay risks in IC Q&A sessions
- Regulatory Requirements: 10Qs must include explicit risk disclosures
- Average IC Sentiment: 3.06
- Average 10Q Sentiment: 2.89
- ICs consistently show higher sentiment scores than 10Qs

Overall Credit Sentiment



- The overall trend suggests a divergence in financial performance among major banking institutions especially between large vs. small banks.
- The divergence in sentiment suggests that some institutions are struggling while others are improving.
- Larger banks like Goldman Sachs and Citigroup show declining sentiment, while regional banks such as PNC and Byline Bancorp see improvements.
- However, overall sentiments improved in 2024 compared to sentiments in 2023.

Fintechs

- Credit Risk Management Effectiveness
- Credit Risk Outlook

Credit Risk Management Effectiveness

These are the sectors taken into consideration:

1. Personal & Consumer Loan Providers

2. Buy Now, Pay Later (BNPL) & Alternative Credit

3. Credit Card Issuers & Subprime Lending

4. Auto & Specialty Loan Providers

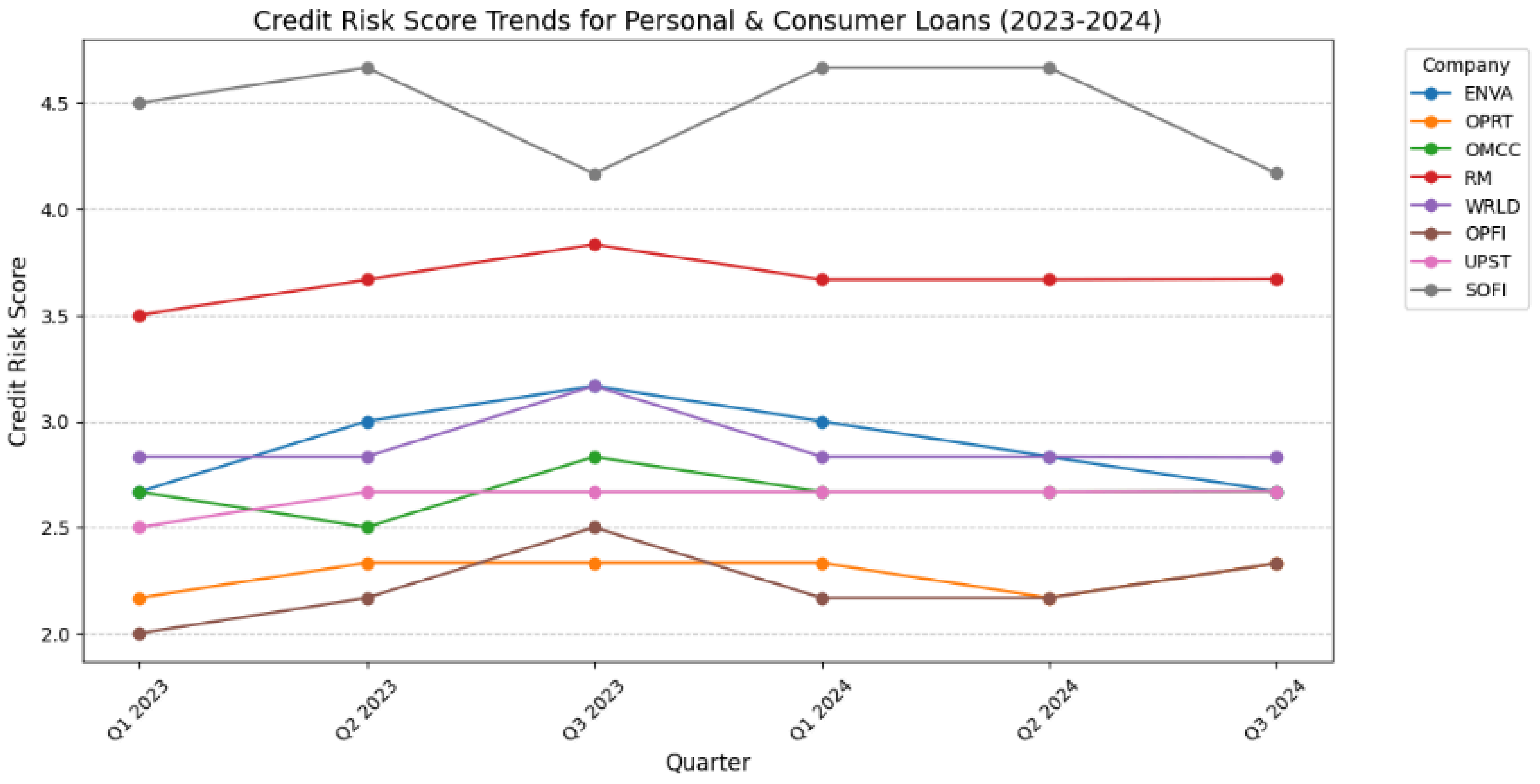
5. Mortgage & Home Loan Providers

Personal & Consumer Loans

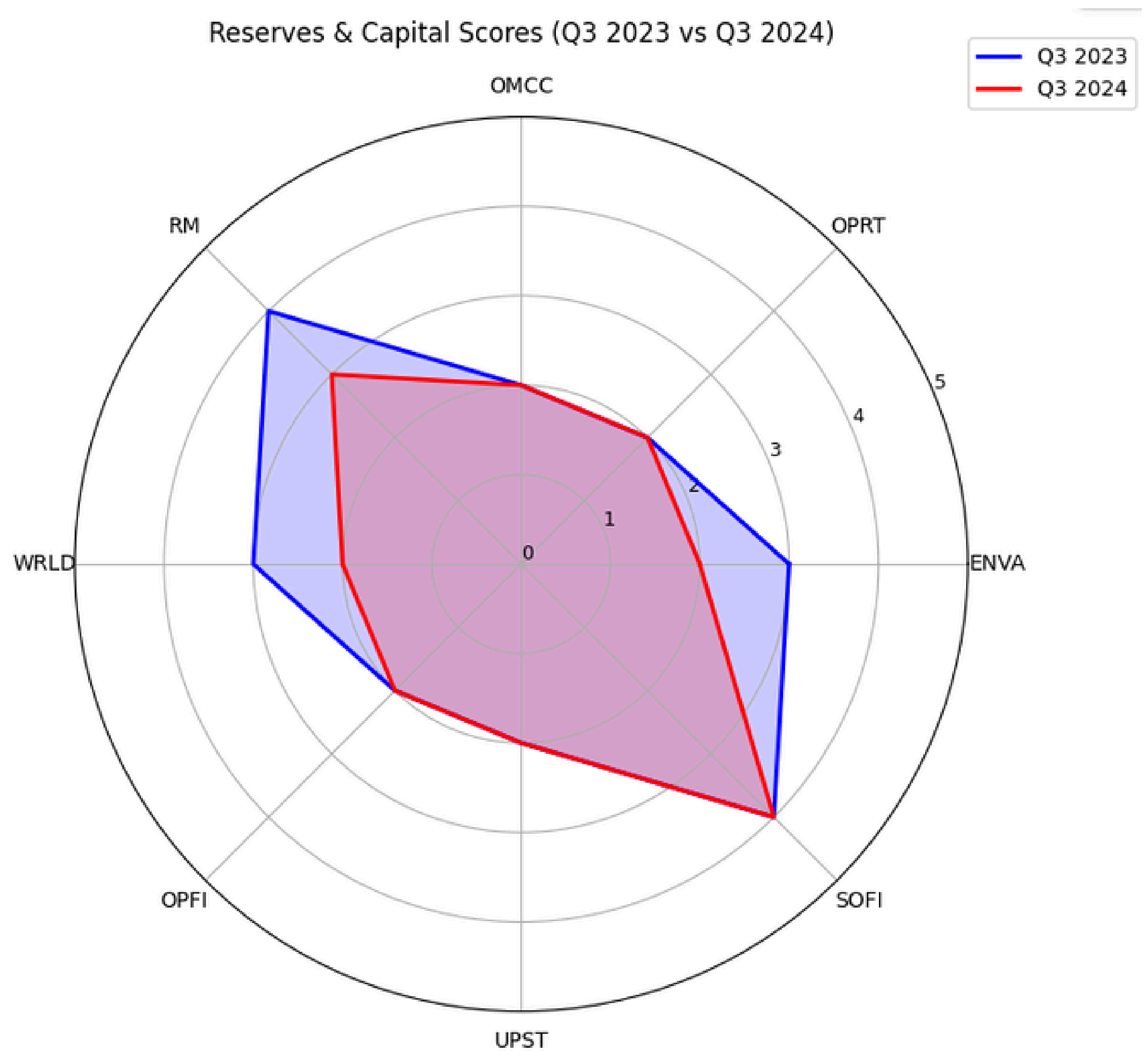
- **SoFi** Maintains Strongest Credit Profile: A diversified lending portfolio, higher-quality borrowers, and better capital buffers.

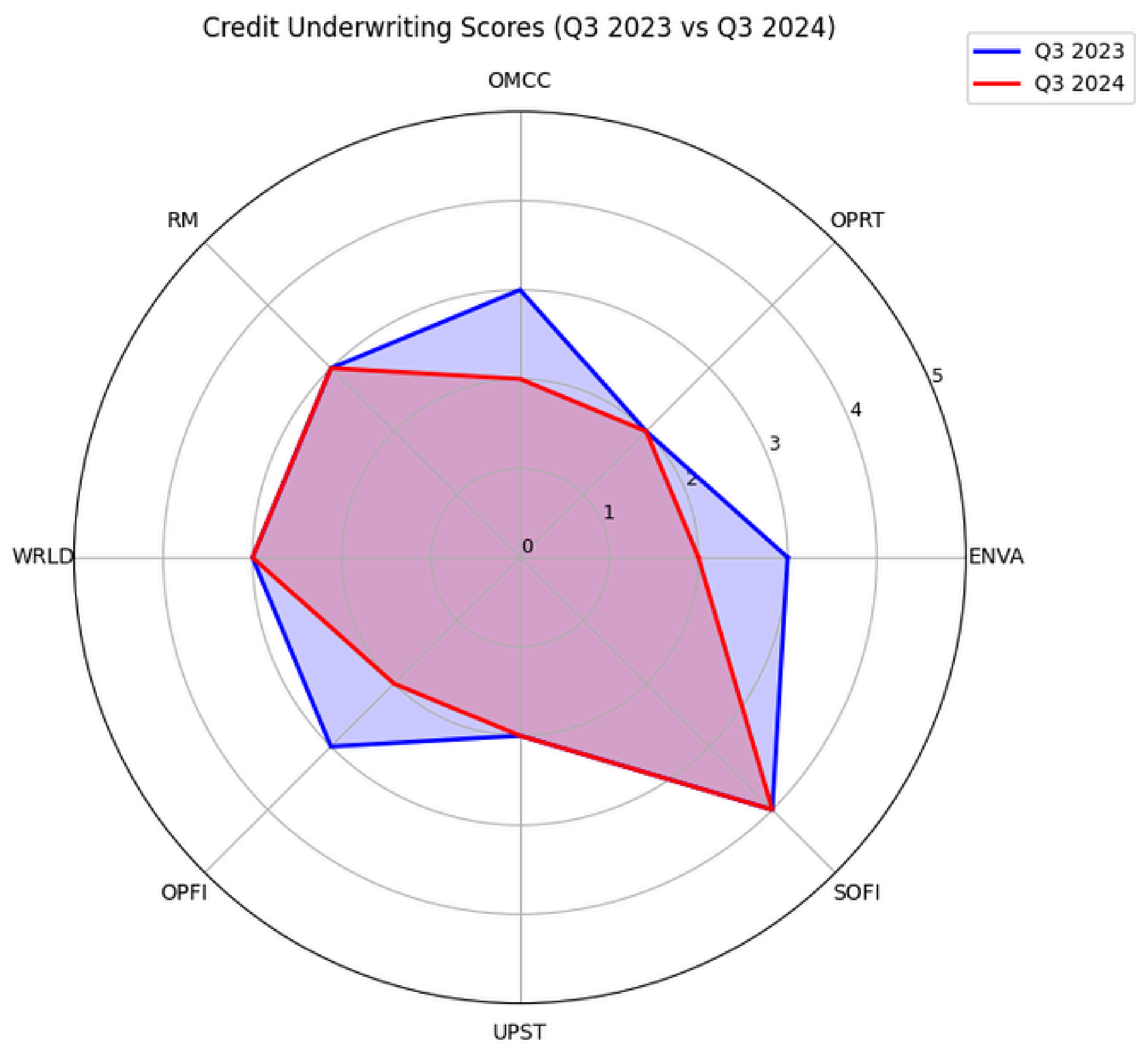
- Personal lenders (e.g., OppFi, Oportun) that focus on lower-income borrowers were hit hardest, as their customers were already financially stretched.

- **General Decline in Credit Risk Scores After Q3 2023**



Key Driving Factors





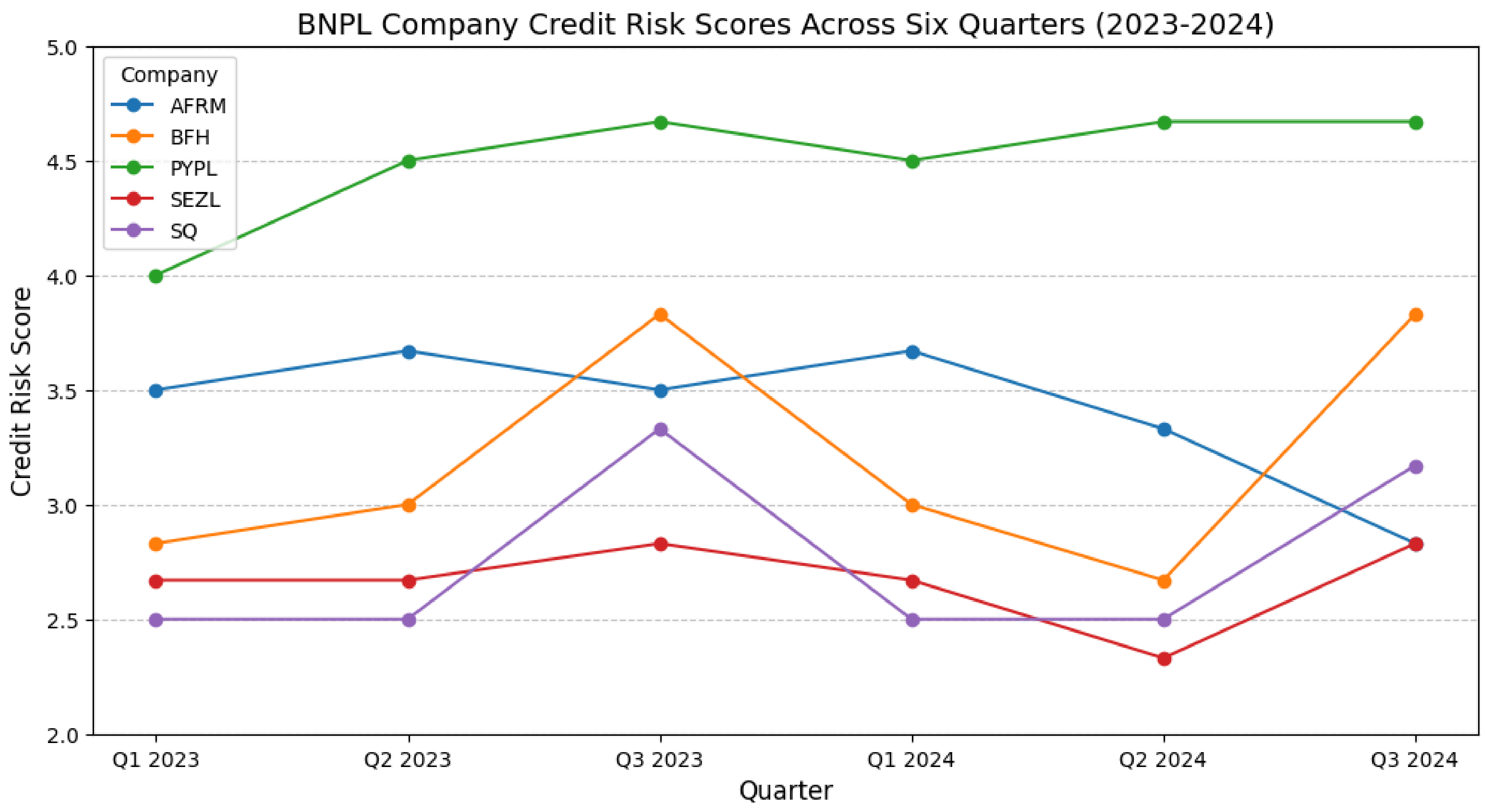
- Tighter Liquidity & Funding Challenges
- Recessionary Fears
- Weaker Investor Confidence in Riskier Loans

- Rising Interest Rates
- Increased Loan Defaults & Delinquencies

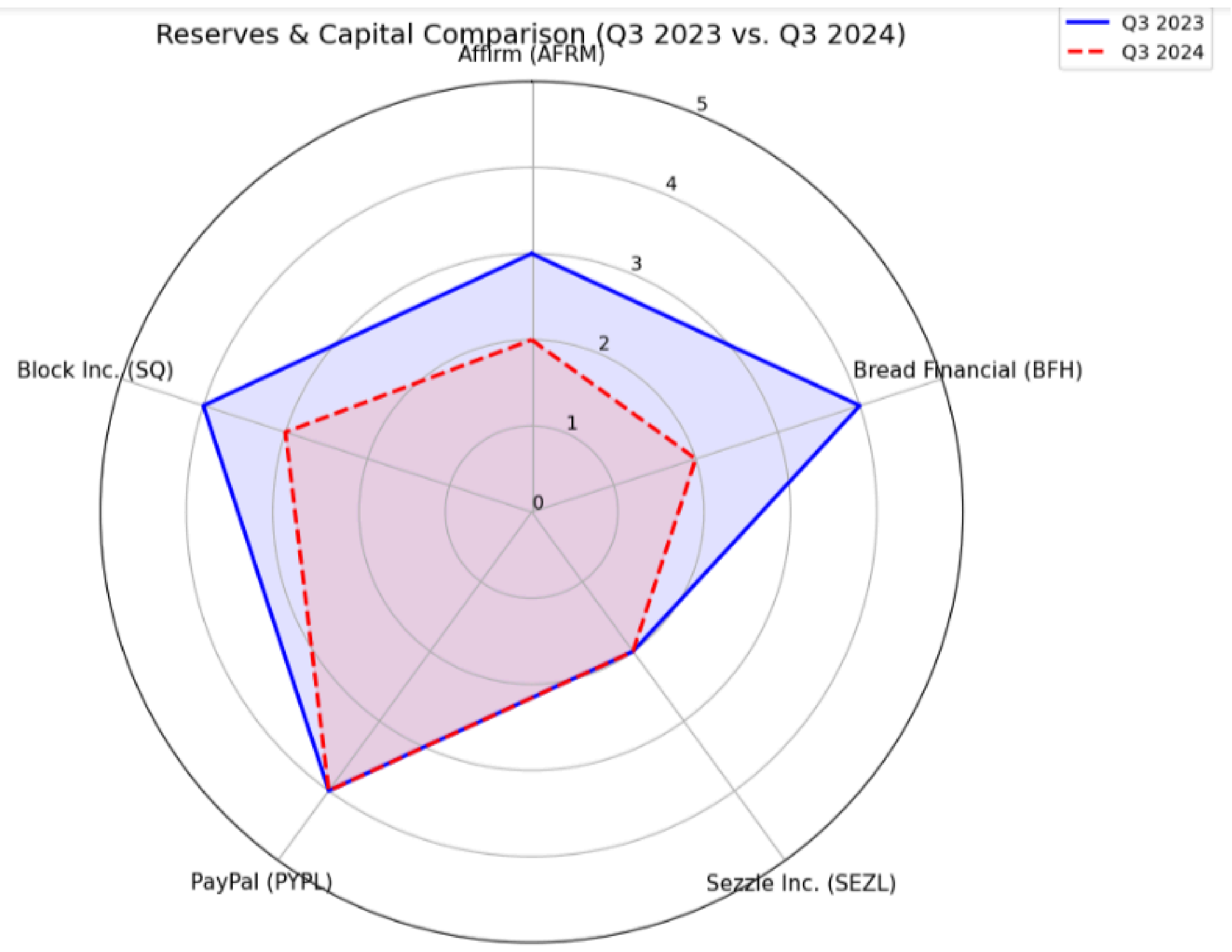
Buy Now Pay Later (BNPL)

- Increase in Credit Scores from Q2 2023 to Q3 2023.
- BNPL credit risk scores peaked in Q3 2023 but declined from Q4 2023 through Q3 2024.

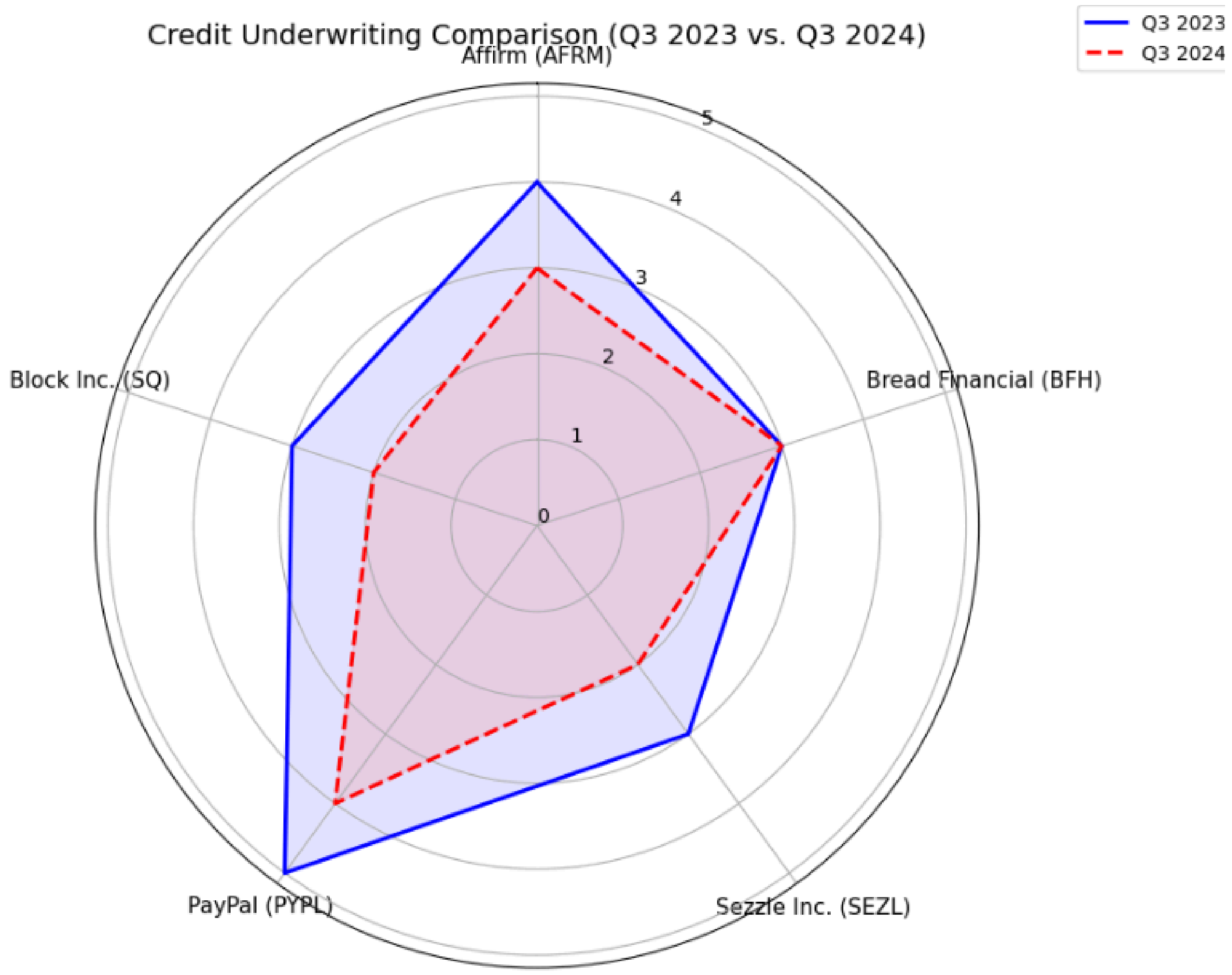
- PayPal consistently outperforming its BNPL competitors.
- Affirm & Sezzle saw worsening credit scores in 2024.
- Bread Financial & Block showed volatility in their scores over time.



Key Driving Factors



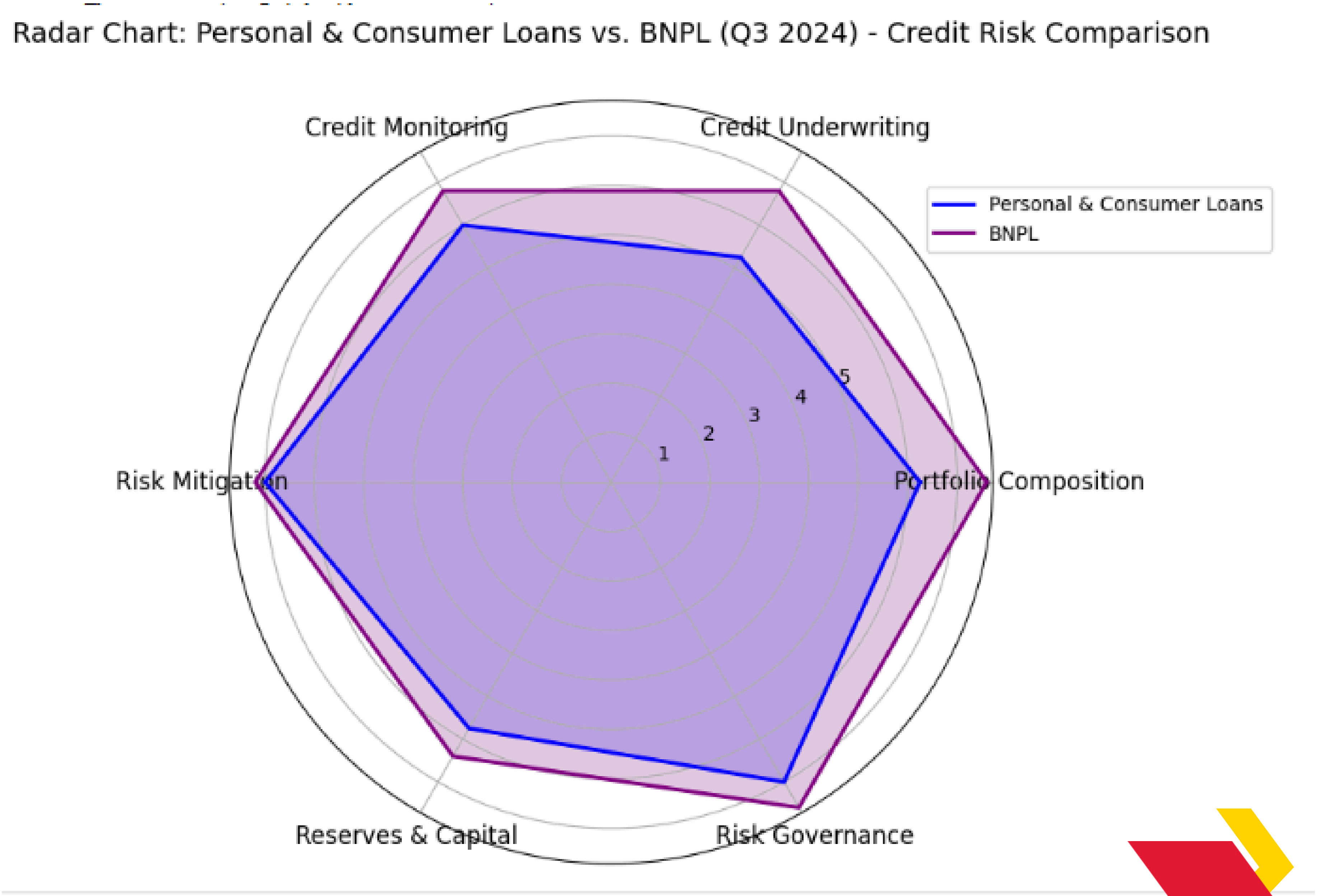
- Charge-offs Increased
- Subprime Borrowers Struggled Maximum



- Revised credit models
- Cautious lending slowed loan approvals

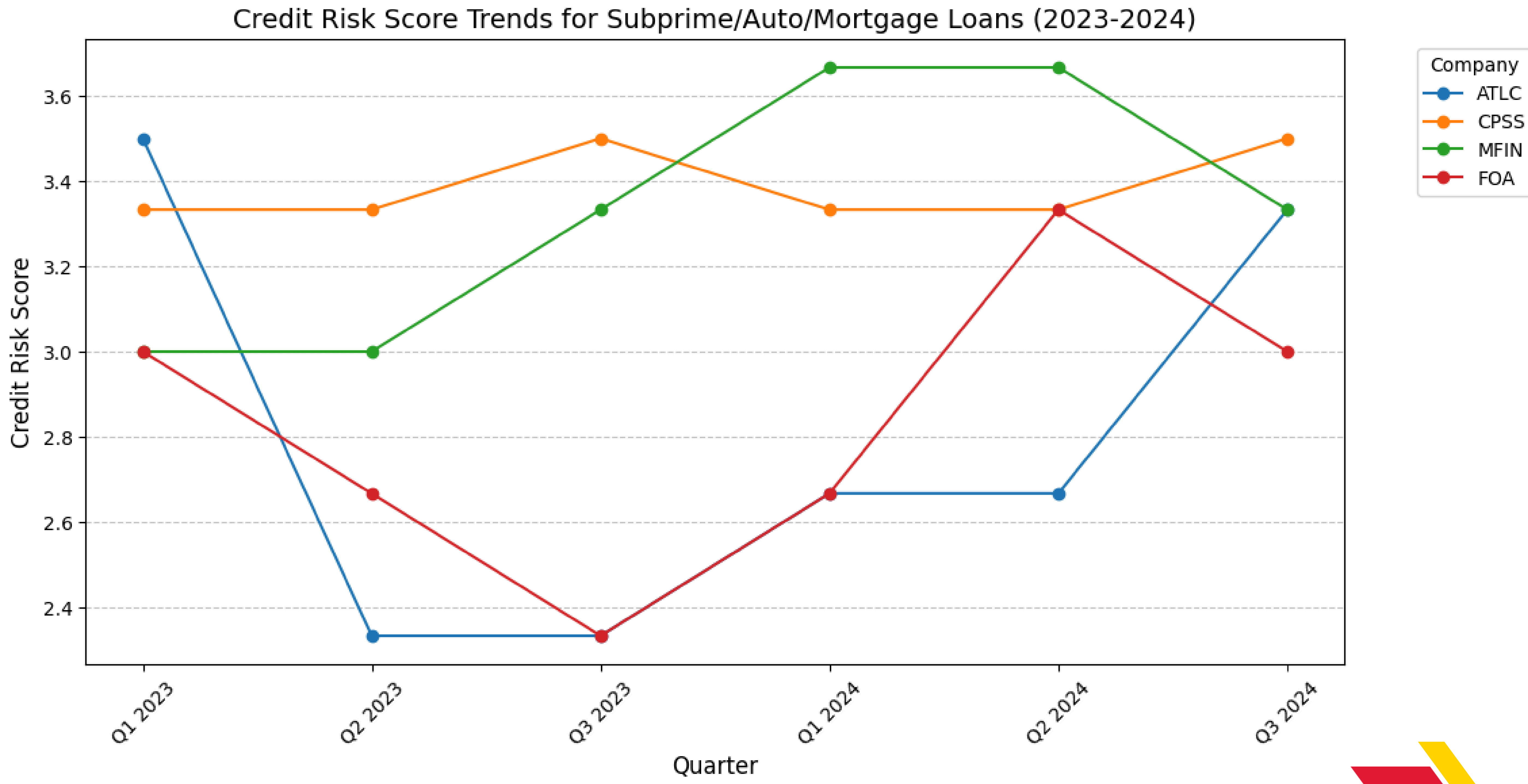
BNPL vs. Personal Loans: Who Manages Credit Risk Better?

- BNPL lenders have stronger credit underwriting & governance.
- Personal loan lenders face higher delinquency risks.
- Both sectors face capital adequacy challenges.
- BNPL lenders are more resilient in risk mitigation.



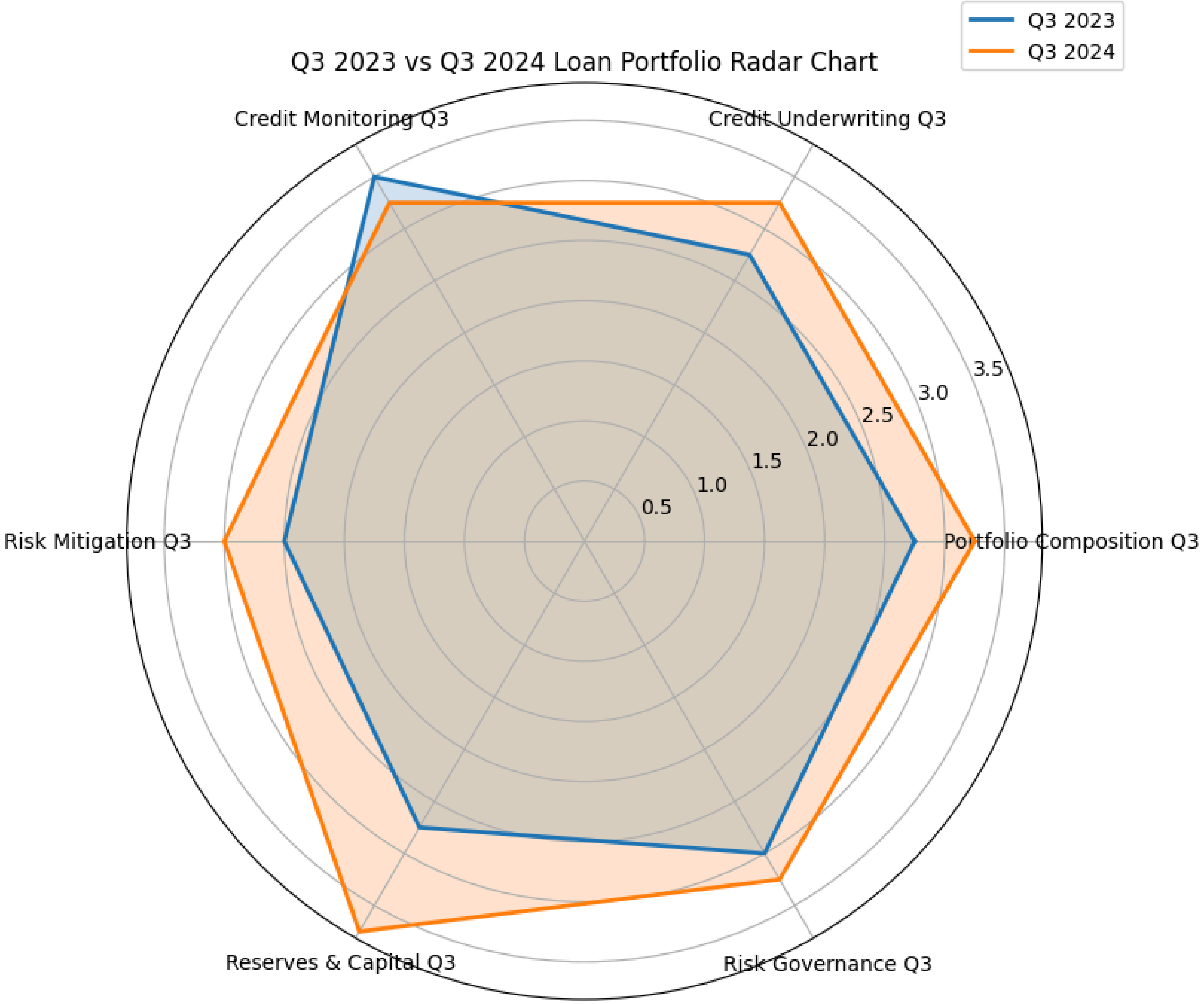
Subprime/Auto/Mortgage Loans

- ATLC and FOA experienced weaker underwriting practices and exposure to riskier borrowers which has primarily driven the decline
- CPSS and MFIN have maintained steady underwriting and credit monitoring policies, avoiding major shifts in risk exposure.



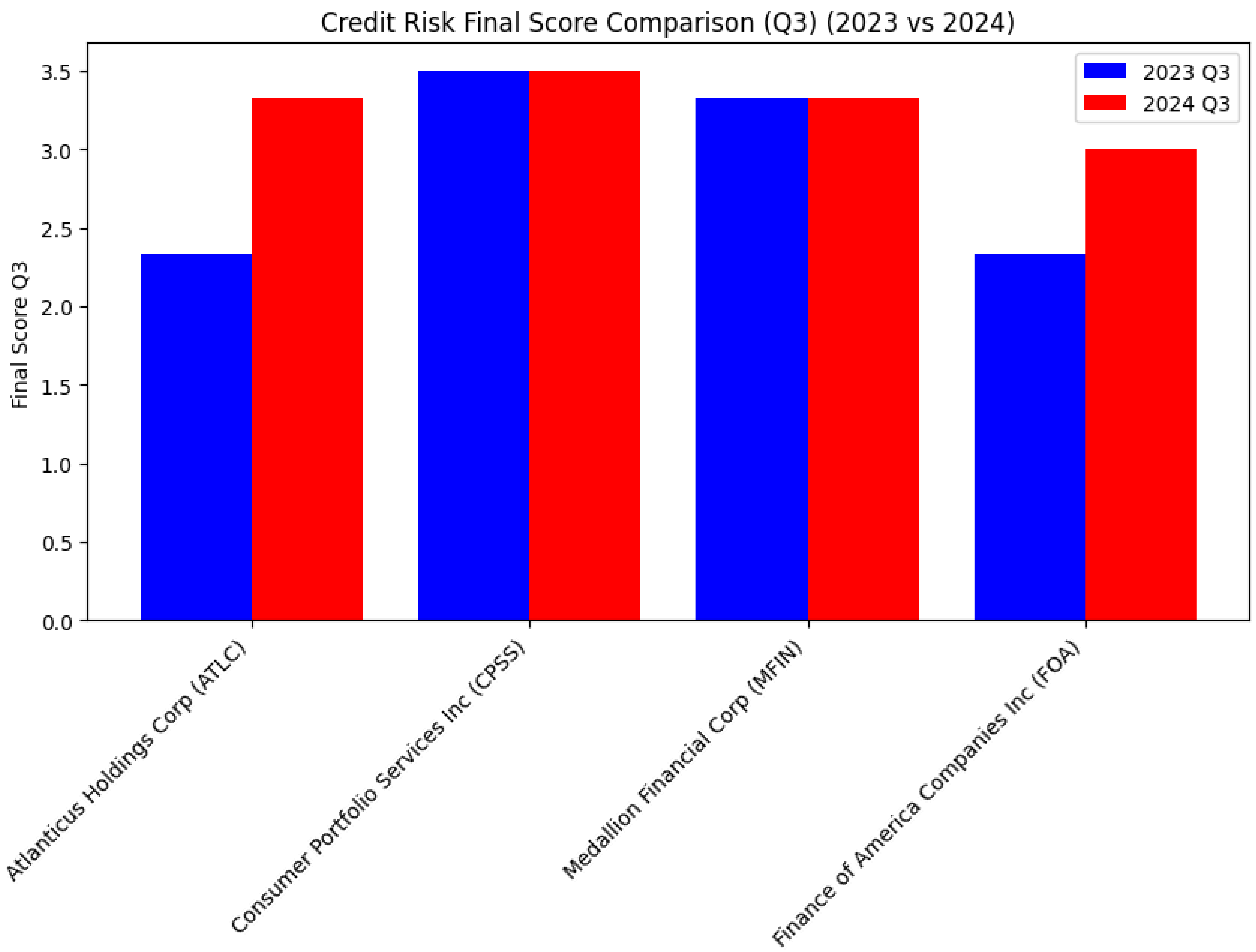
Subprime/Auto/Mortgage Loans

- Heavier emphasis on Reserves & Capital and Risk Mitigation
- Less emphasis on Credit Monitoring and Credit Underwriting
- A greater focus on Reserves & Capital suggests that these companies set aside more capital to buffer against potential credit losses. This could be in response to rising delinquencies.
- Lower scores in Credit Monitoring suggest that these companies may be pulling back on aggressive lending.



Subprime/Auto/Mortgage Loans

The average upward trend in credit scores of these companies is primarily due to the increase in Reserves & Capital and Risk Mitigation



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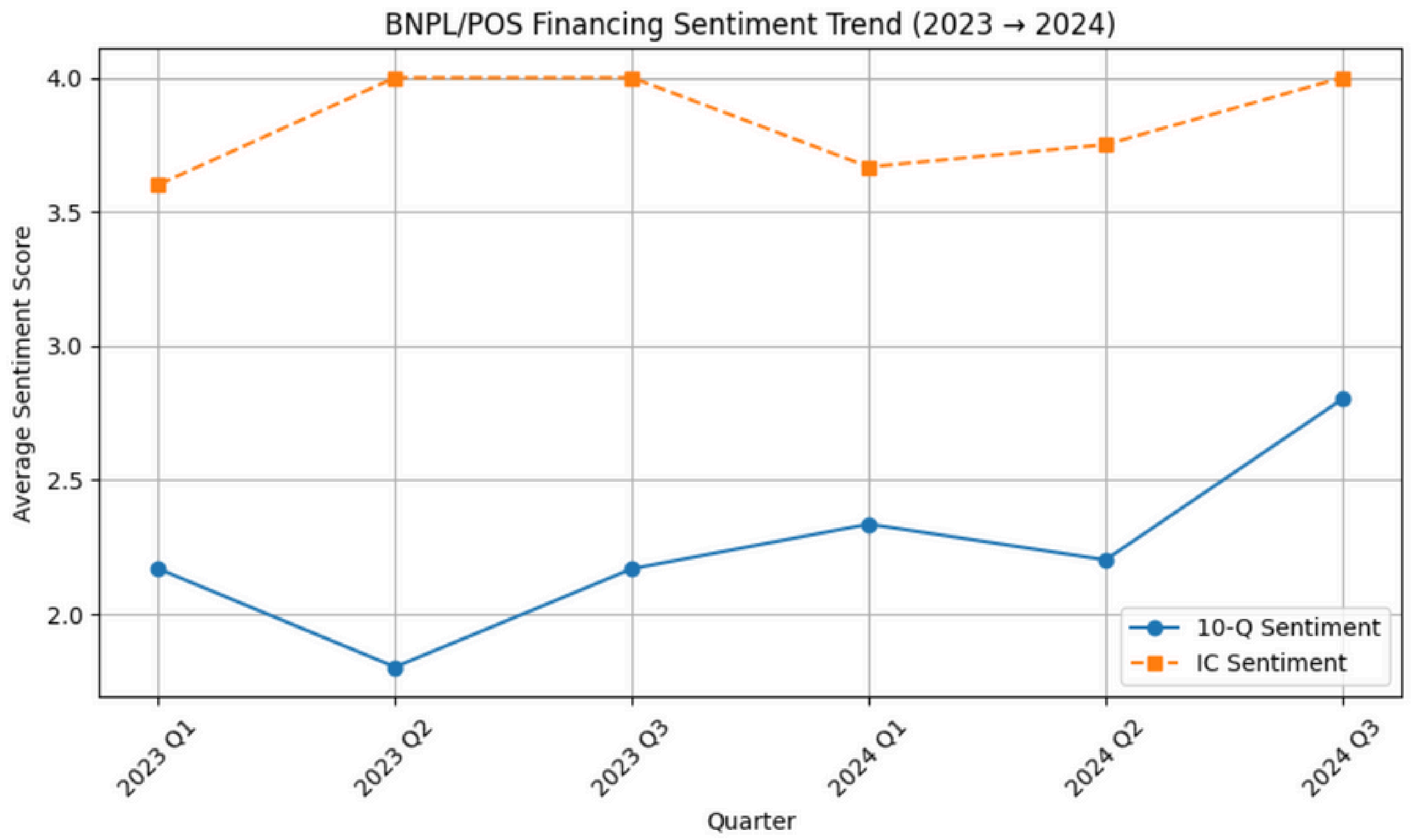
Credit Risk Outlook

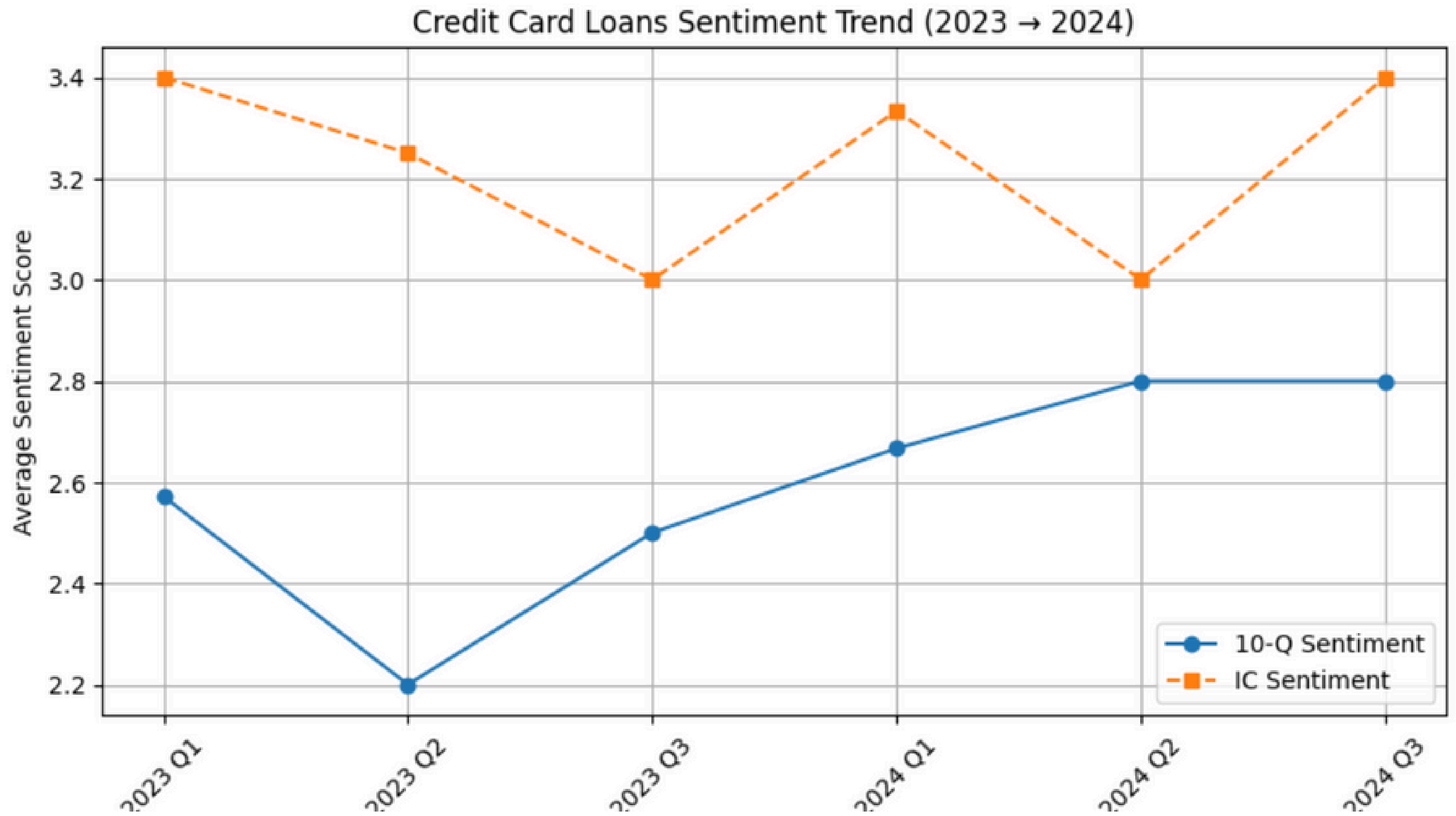
These are the sectors taken into consideration:

1. Buy Now, Pay Later (BNPL) / POS Financing
2. Credit Card Loans
3. Auto Lending
4. Real Estate Lending
5. Securitized and Structured Credit
6. Personal Loans
7. Student Loans

Sentiment Trend for Each Segment

- Averaged the sentiment scores for each lending segment
- Left missing values blank (scores reflect only the firms engaged in those segments)
- Upward trend from Q1 2023 to Q3 2024
- Fintech industry has generally improved across the quarters analyzed.
- Dip in Q2 2023





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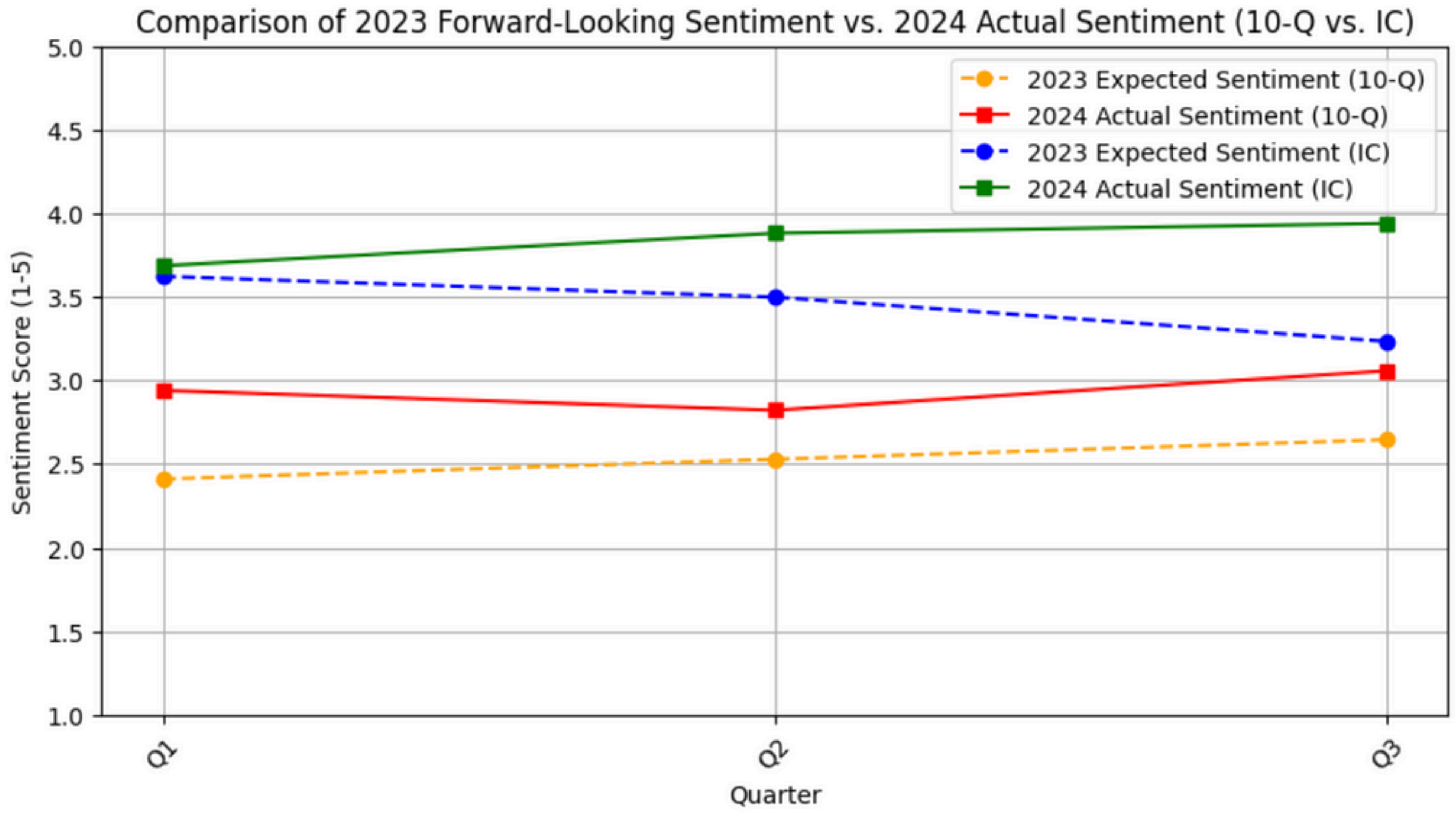
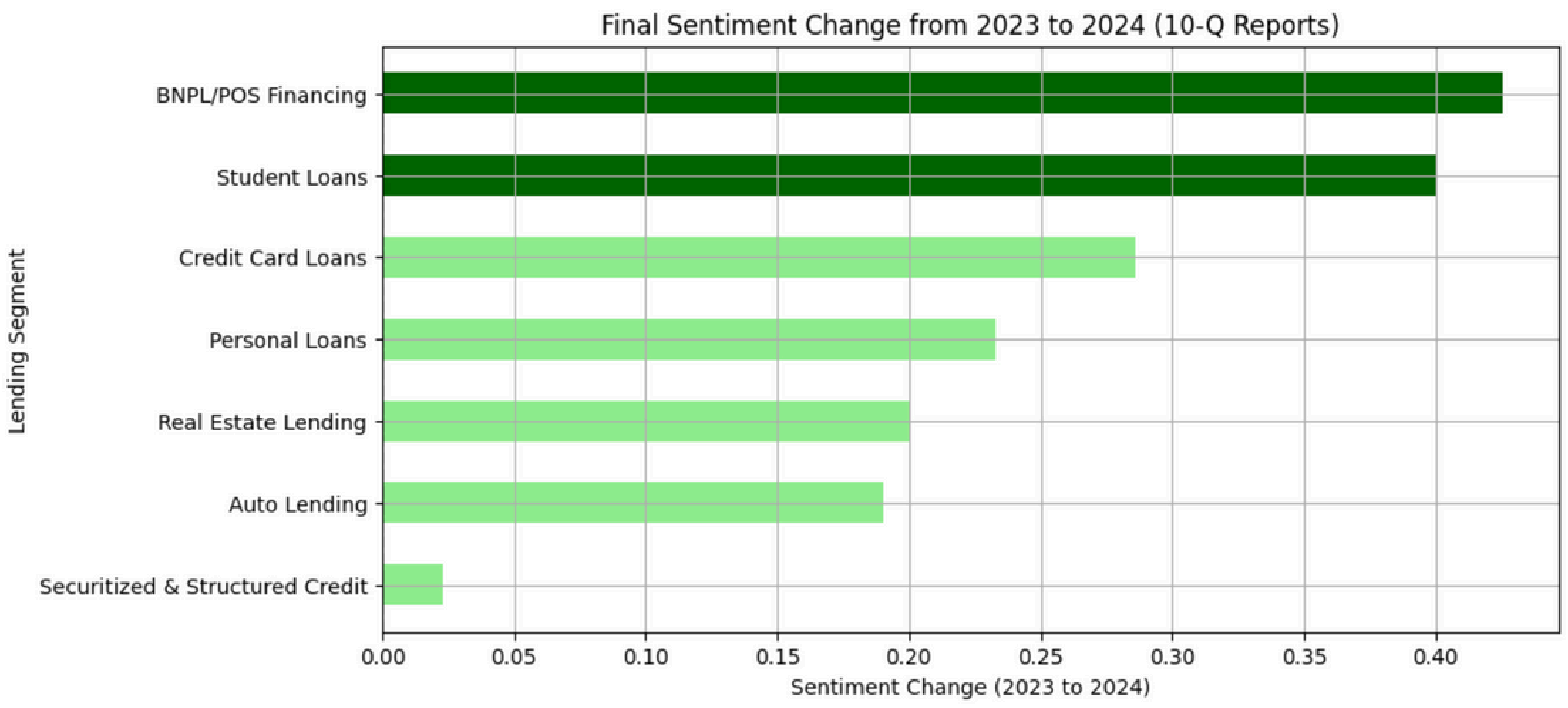
2023 Forward Looking vs 2024 Score

- Fintech's reality was more favorable than expected
- 2023 had a conservative forward-looking due to macroeconomic uncertainty, credit deterioration, higher provisioning, and delinquencies
- 2024 economic conditions were better than forecasted, improved in credit performance, consumer behavior, and operational strategy
- Investor Call (IC) is more bullish than 10Q



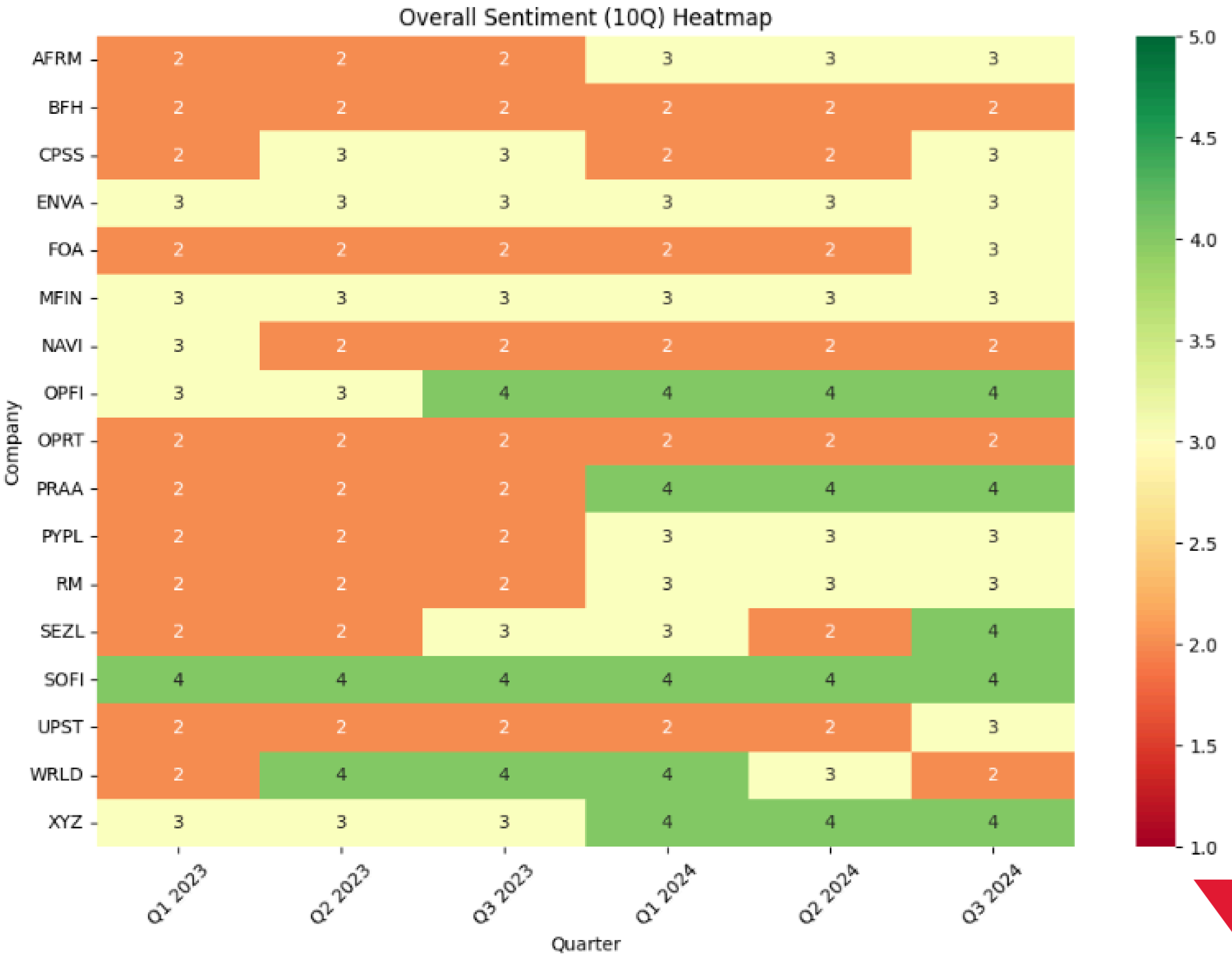
Sentiment Change

- BNPL/POS Financing
  - strong growth in consumer adoption and merchant partnerships in 2024
  - AFRM highlights aggressive product rollouts, expansion into new verticals
- Credit Card Loans
  - higher than expected in consumer spending
  - predicted rising charge-offs but performance was more resilient
- Securitized & Structured Credit
  - tends to be more macro-sensitive so limited upside surprises



Forward Looking Sentiment (10Q)

- SOFI maintained a sentiment score of 4 across all quarters from Q1 2023 to Q3 2024.
- Companies like SEZL, OPFI, PRAA, and XYZ showed a clear trend of increasing sentiment from Q1 2023 to Q3 2024.
- Many companies, including AFRM, CPSS, FOA, PRAA, PYPL, RM, and UPST, consistently improved from slightly negative to neutral sentiment across the quarters.



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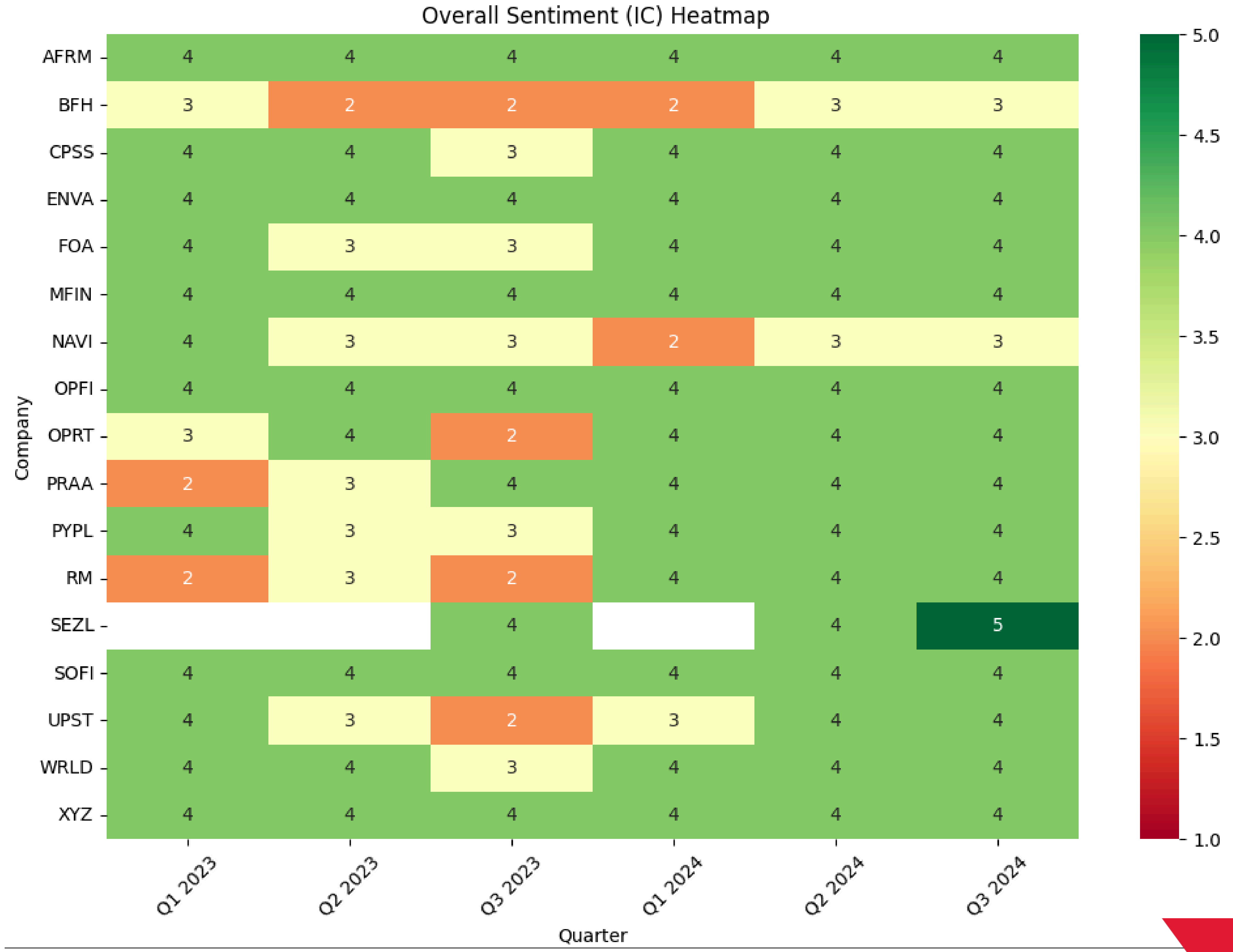
Forward Looking Sentiment (IC)

- Investor call transcripts are often optimistic, as executives emphasize strengths and downplay risks. Sentiment models may overweigh positive language and miss financial stress indicators.
- Additionally, hard credit metrics like leverage, cash flow, and defaults are not directly reflected, leading to inflated sentiment scores.



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Insights

- Key Takeaways

Key Takeaways

- We can conclude that Google AI Studio has the ability to reliably identify trends and sentiments from financial disclosures and Earnings Call Transcripts. For example, our model successfully identified distressed banks in our 2008 test and NYCB in recent data.
- We conclude that bank credit and sentiment outlook have declined since Q1 2023, which is supported by data from the call report and insights from Gemini.
- We observed that credit risk mitigation has the worst score in credit risk management effectiveness, implying that banks can benefit from reviewing and updating their current credit risk mitigation practices.
- In contrast to this, Fintech credit and sentiment outlook have been rising over the same period, likely pointing towards a more favorable regulatory environment or because Fintechs are not the holders of the risk.
- It confirmed our hypothesis that the investor calls are more optimistic than the 10Qs, attributed to the more neutral legalese in the 10Qs.

Unique Generative AI Analysis of Credit Risk

Who benefits?

- Banks, Financial Institutions & Fintech companies – Evaluate risk trends and market positioning.
- Institutional & Retail Investors – Understand company credit risks before investing.
- Regulators & Policy Makers – Identify systemic risks and macroeconomic trends.

Why is this tool unique?

- AI-Powered Benchmarking – Automates credit risk management effectiveness & outlook scoring
- Unmatched Sentiment Analysis – Extracts insights from earnings calls & financial statements
- Proven Predictive Capabilities – Successfully identified distressed banks (e.g., 2008 crisis test)
- Scalable & Customizable – Adaptable to different industries & asset classes
- Faster Decision-Making – Reduces time-consuming manual financial analysis

Future Scope

Future Scope

- Our project can be improved to accommodate for higher consistency, which will allow for more reproducible and reliable results. At present, we have a 39% accuracy across multiple trials of our prompt. With better prompt engineering, we can improve this number.
- Further, we can optimize our current model to scale for higher document capacity. Our dataset was limited to less than 60 companies across 6 quarters, and the model can be scaled to accommodate much larger datasets. We can also go back further and incorporate more quarters.
- We can also optimize our prompt better to deal with 10Ks and extract insights only from those parts where they talk about Q4, thus ensuring we have all 4 quarters.
- Our project can be further enhanced by continuing to compare forward-looking sentiment scores against actual realized sentiment over time. This will help us evaluate how well our model predicts future credit outlook and refine it to improve accuracy.
- Additionally, we can enhance the clarity and impact of our results by developing more intuitive ways to present insights - such as pinpointing “What’s driving sentiment changes?”

Thank You!
Any Questions?

Appendix

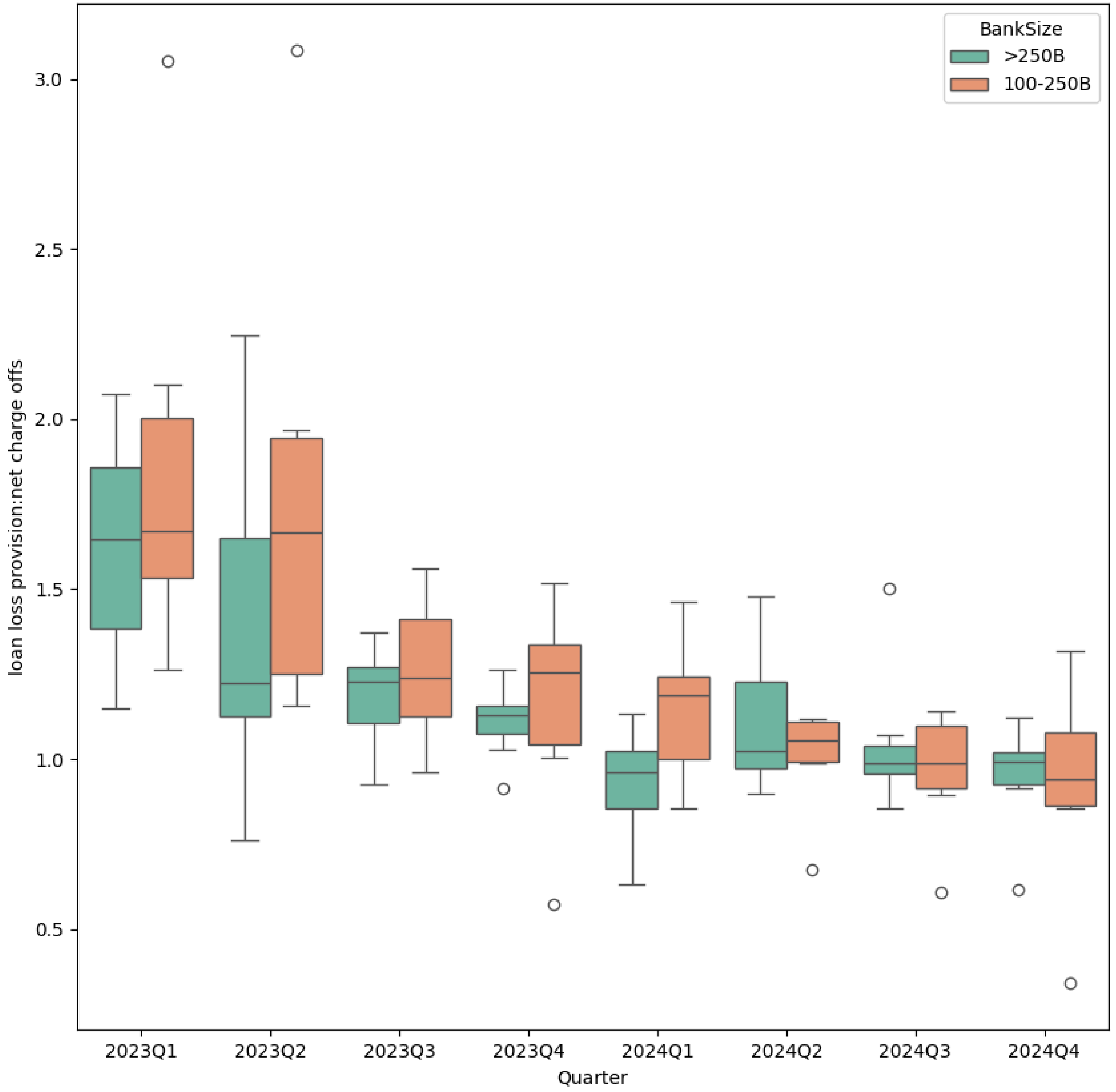
- A1 - Call Report
- A2 - Bank Credit Risk Management Effectiveness
- A3 - Bank Credit Outlook
- A4 - Fintech Credit Risk Management Effectiveness
- A5 - Fintech Credit Outlook

A1 - Call Report

Loan Loss Provisions/NCOs have been decreasing since 2023

There is a downward trend in the loan loss provisions to net charge off ratios (NCOs) over the last 8 quarters.

The key driver for this trend is increasing net charge-offs while provisions remain stable . The median provision to charge off ratio have decreased from 1.6 to 1.0 over the last 8 quarters.



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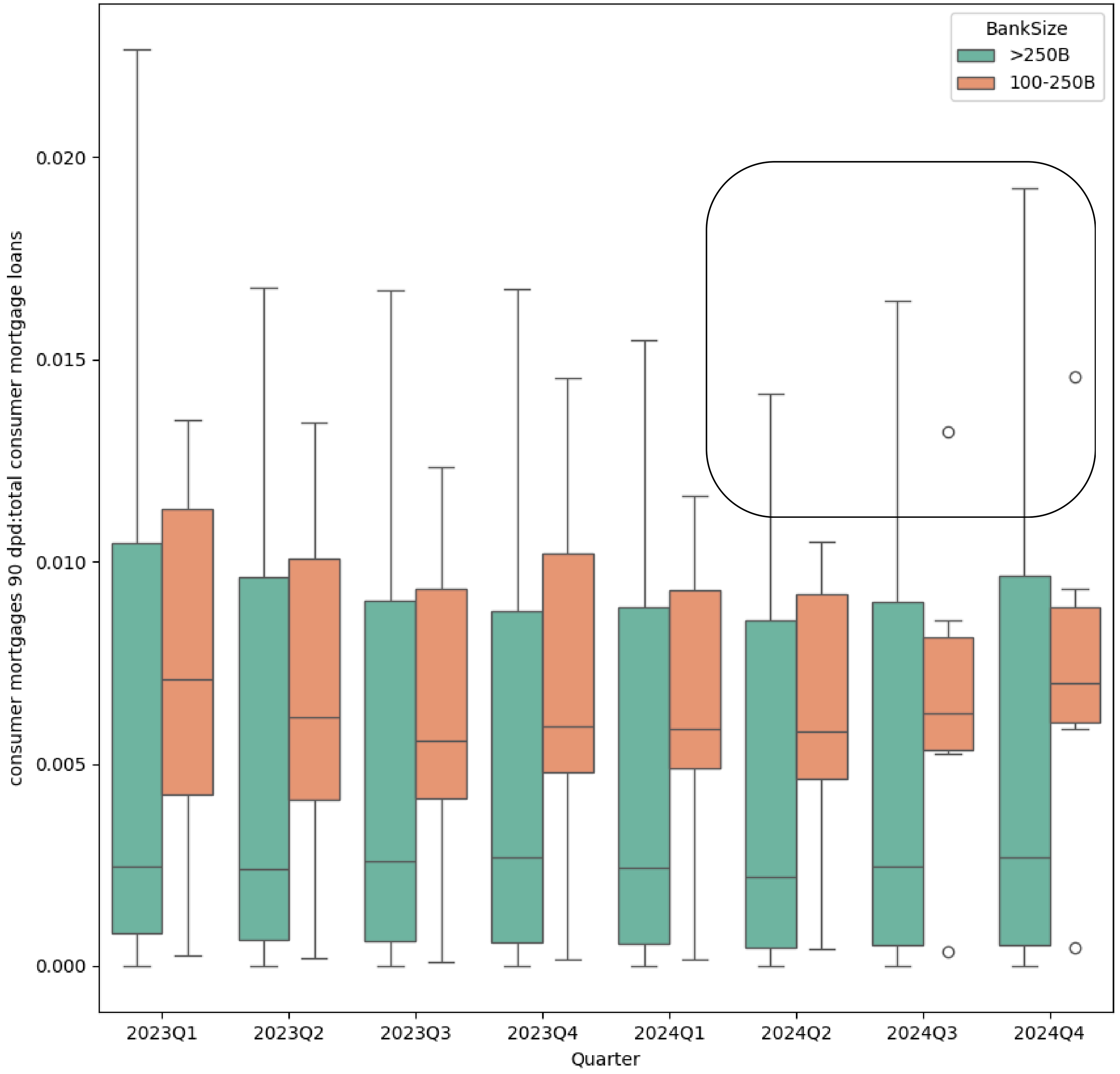
Mortgage delinquencies have been trending upwards

The median mortgage delinquency rates remain stable for the largest banks ($250B) but have shown a slight upward trend among the next category ($100-$250B)

US Bank and M&T Bank are at the tail end of the distributions respectively and have faced much higher delinquency rates over the last two quarters.



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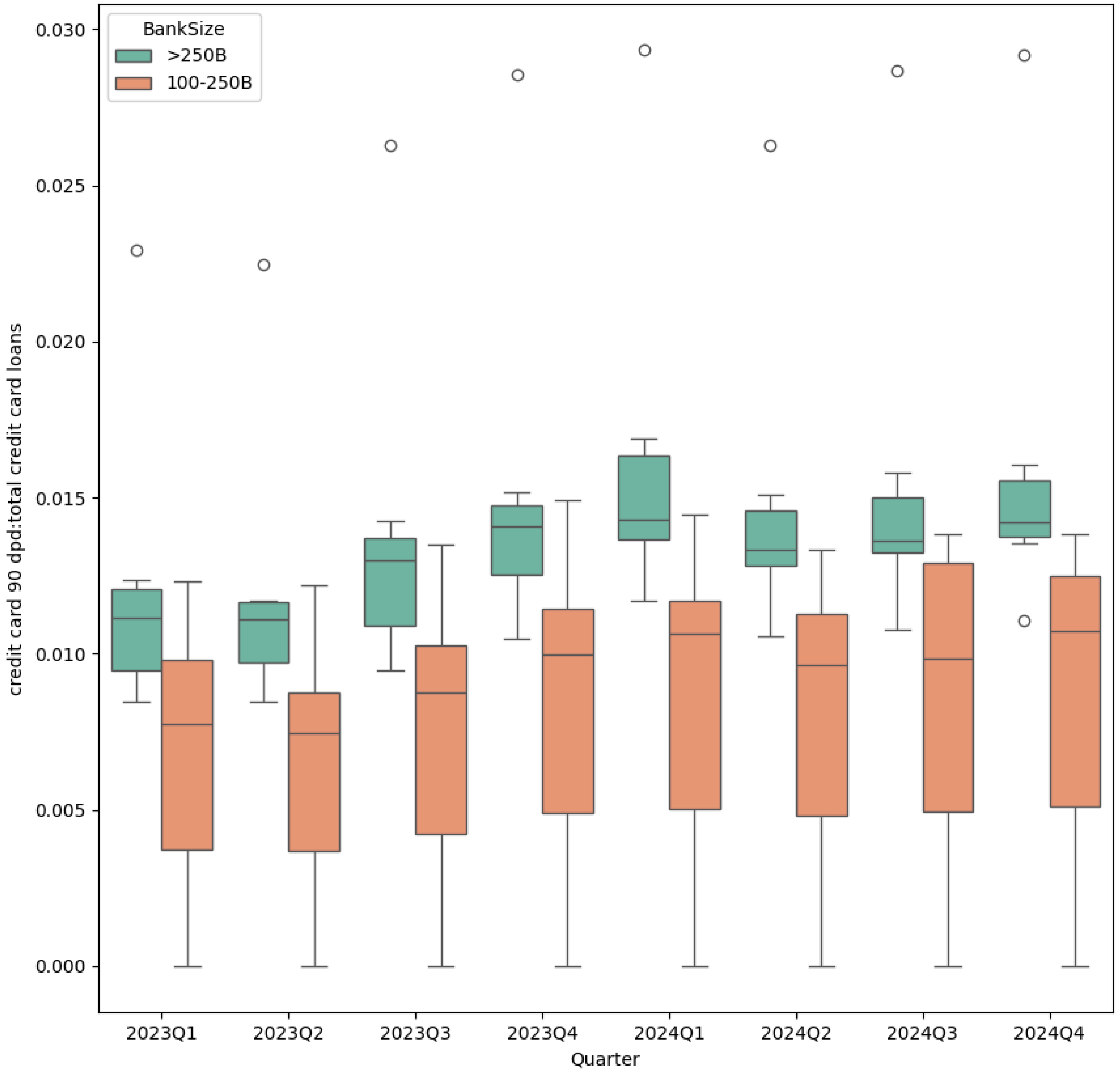
Credit card delinquencies are rising

Americans are falling behind on their credit card payments as seen by the rise in delinquency rates across in 2024. The 90DPD+ rate fell in Q2 2024 but has been on the rise since then.

Capital One Bank which specializes in sub-prime credit card lending has experienced a much sharper rise in delinquency rates.



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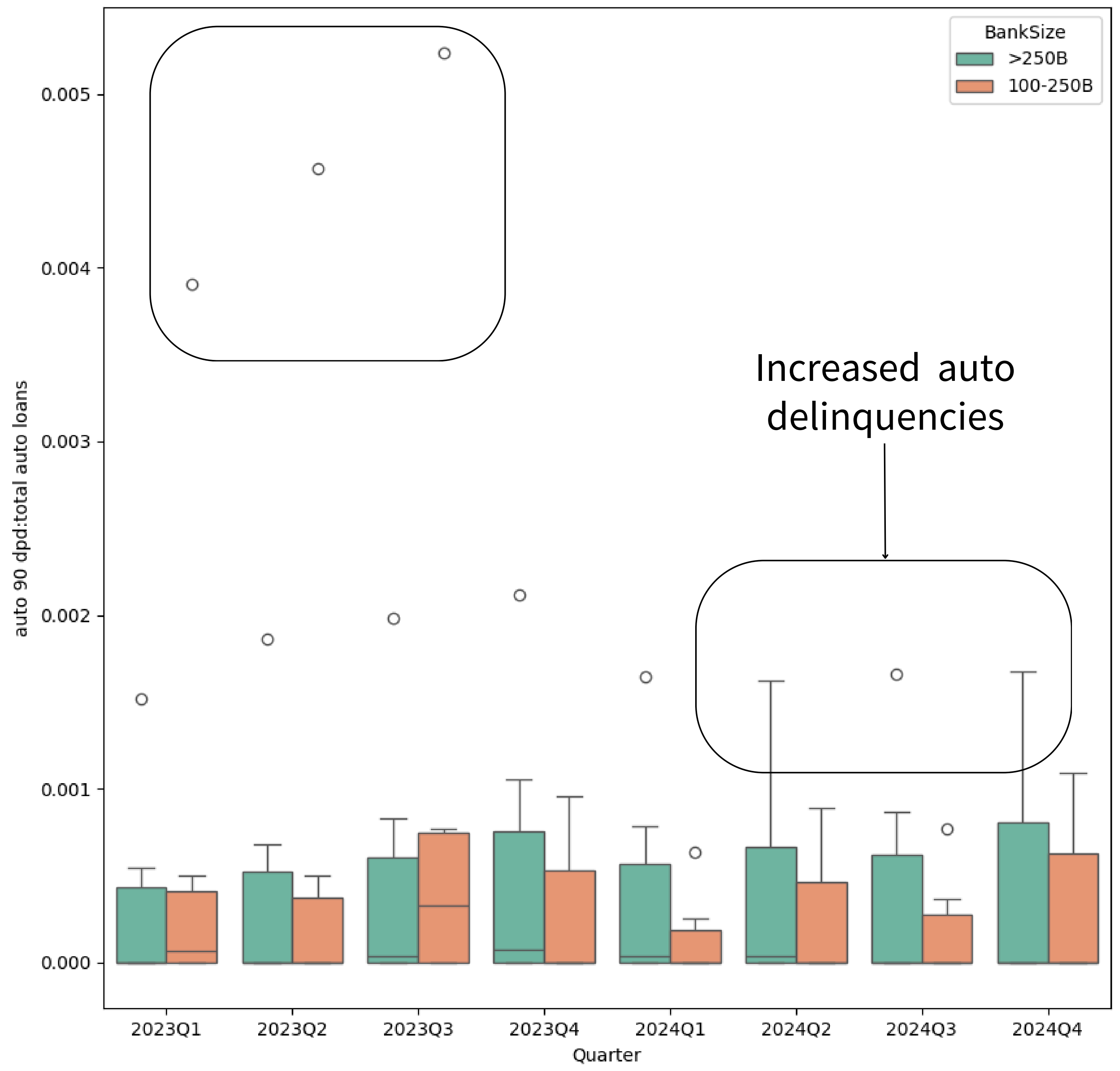
Auto loan delinquencies have been on the rise

Auto Delinquencies have seen a drastic rise in 2024 as compared to 2023. Although the median delinquency rates across the banks remain stable.

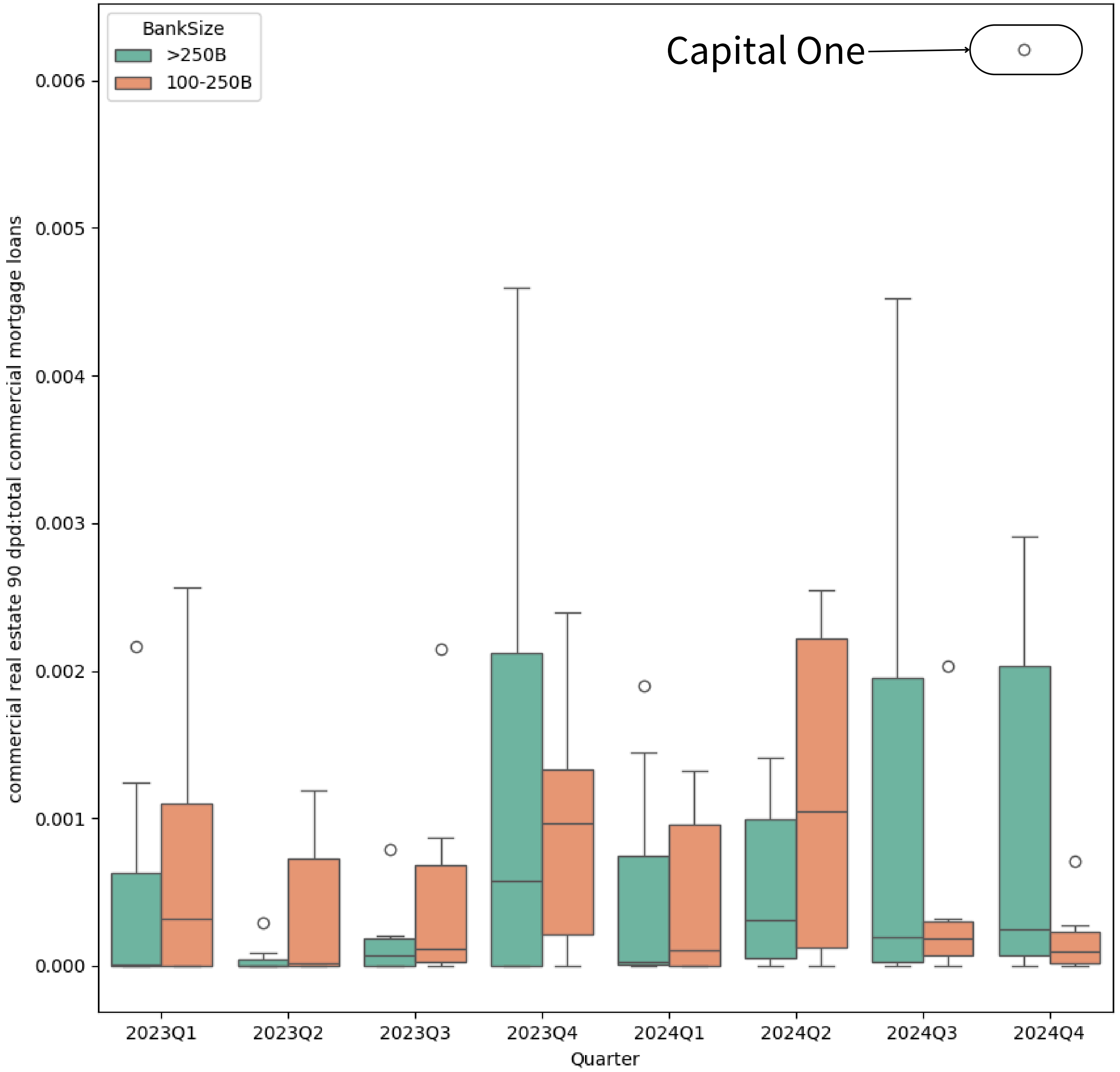
Outliers in the upper end of the distribution include Wells Fargo and US Bank, who are experiencing much higher levels of auto loan delinquencies this year.



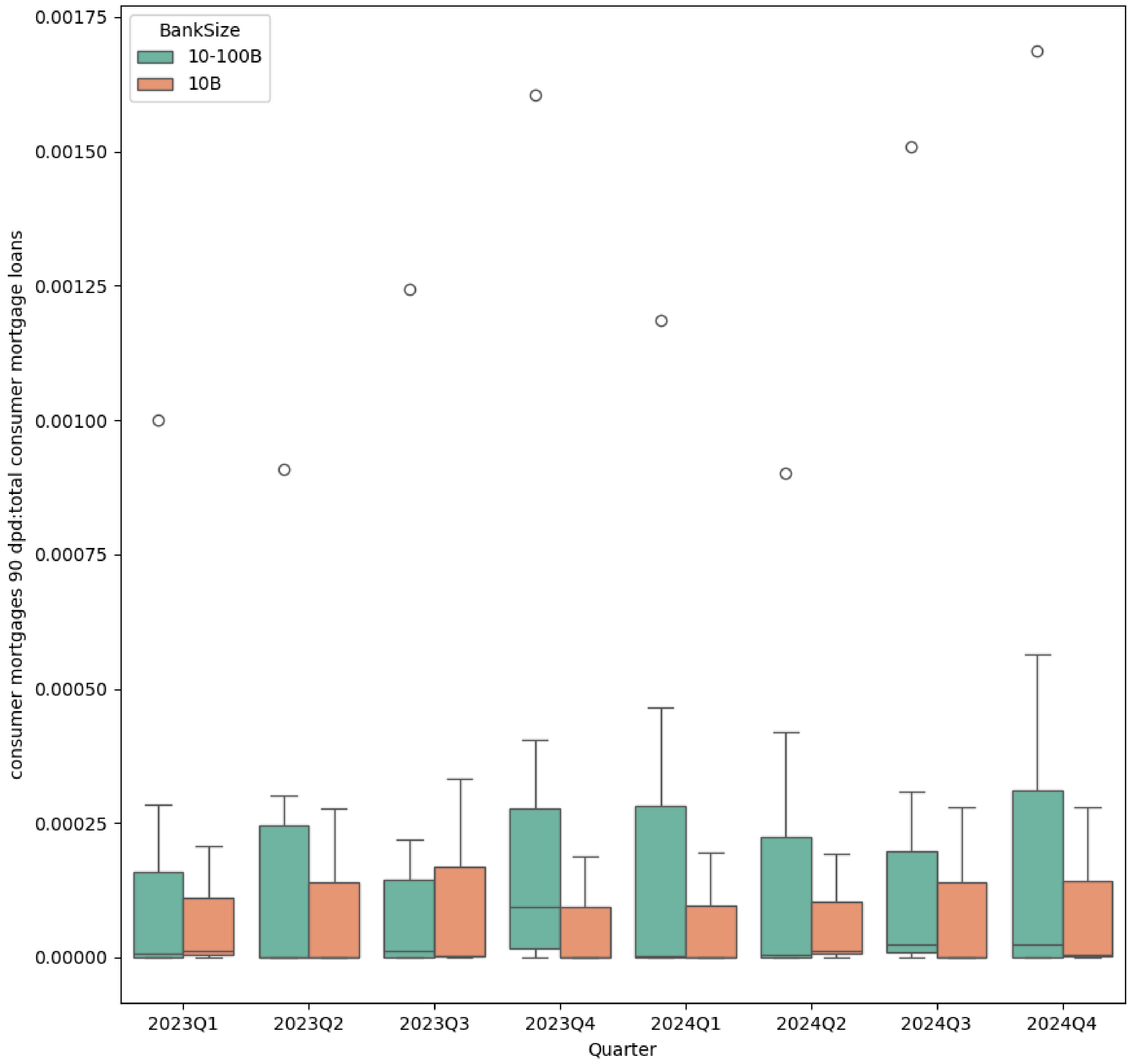
CRE delinquencies differ in the two categories

CRE Delinquencies show opposite trends across the top two segments:

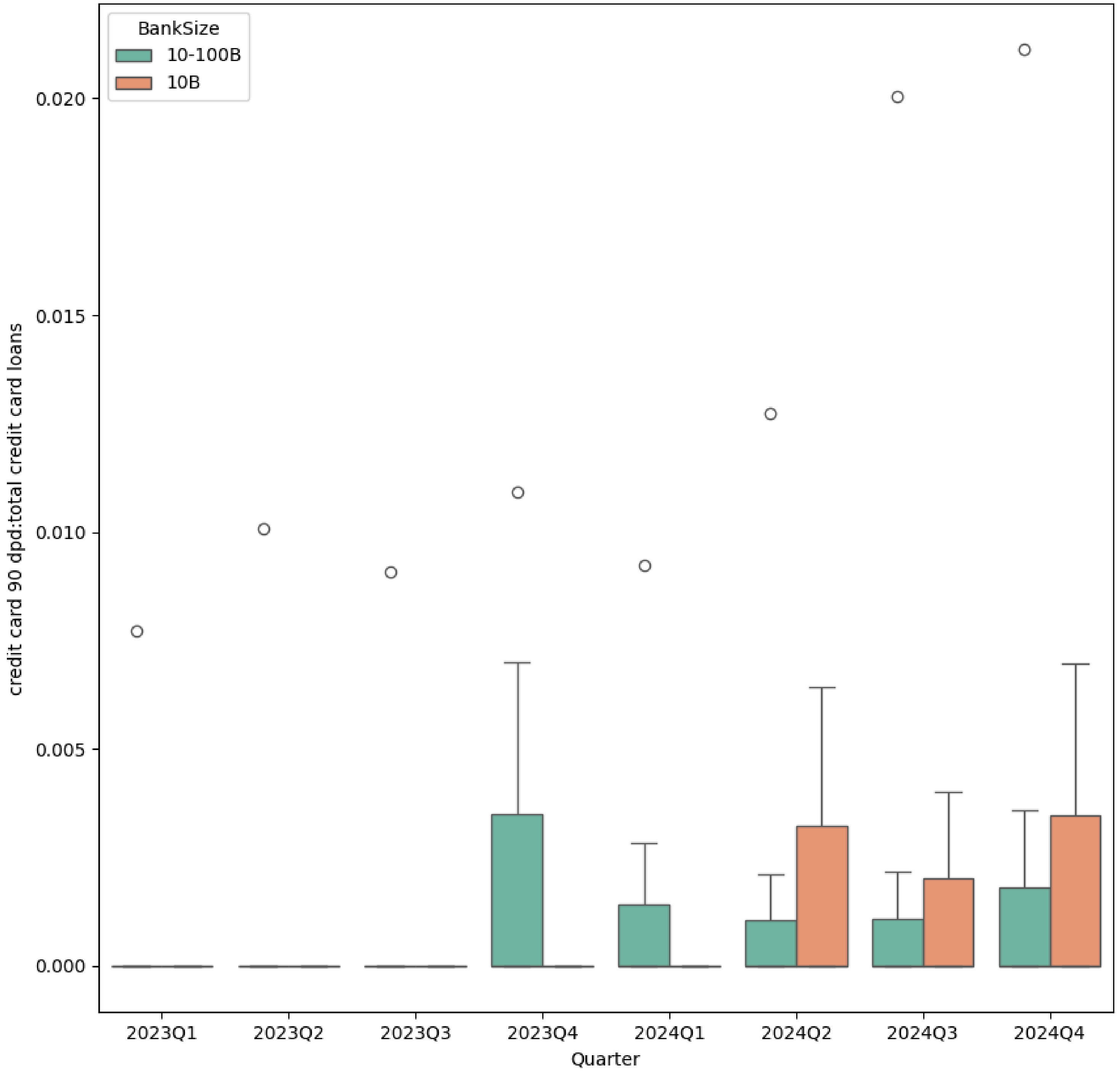
1. The largest banks (>$250B) category have been observing increasing 90DPD+ numbers on CRE loans. Capital One has seen the highest delinquency rates this last quarter over the observed period
2. The mid-tier banks ($100-$250B) category have been facing much lower CRE delinquencies in the last two quarters



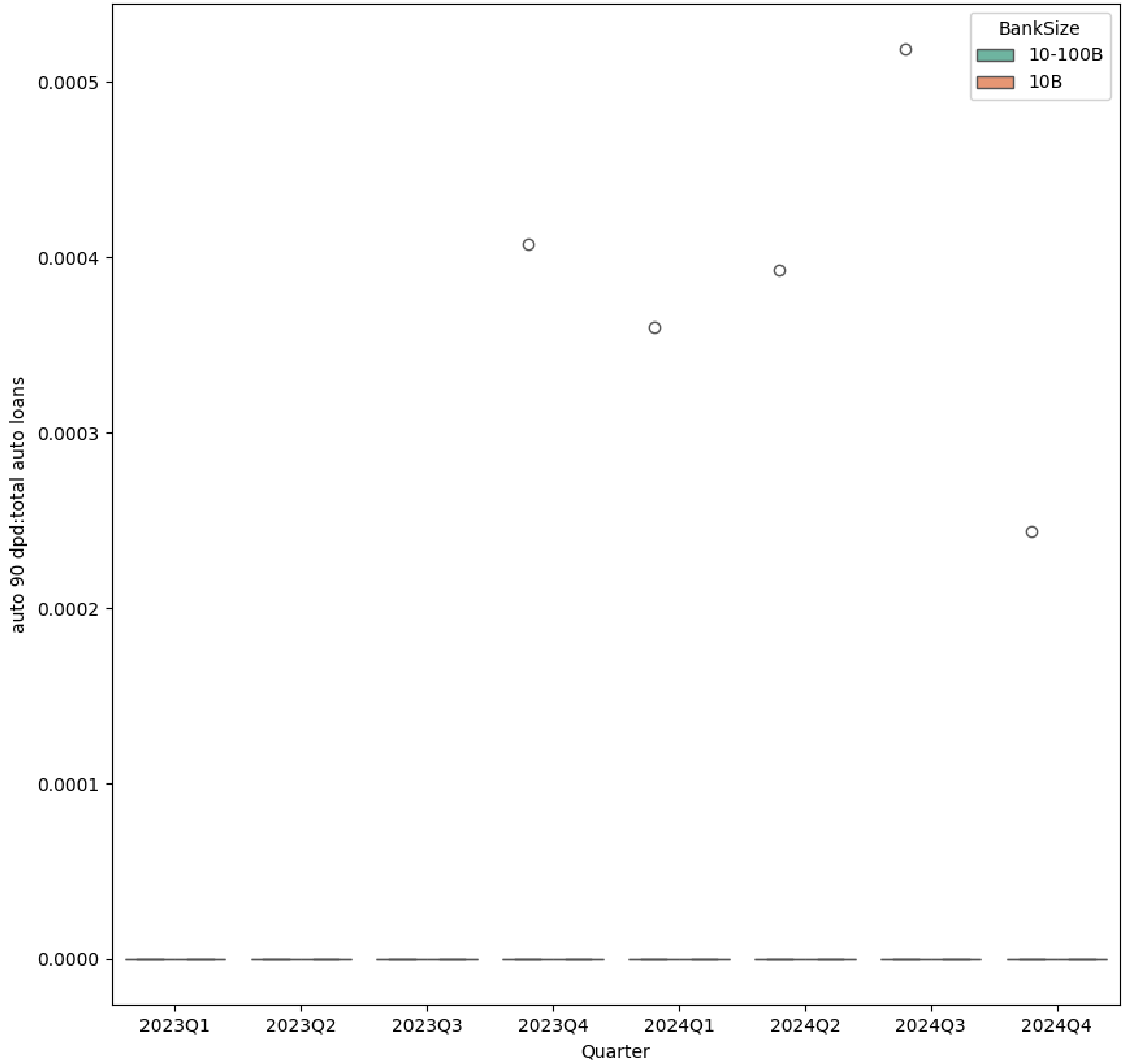
Mortgages (90DPD+) - Bottom 2



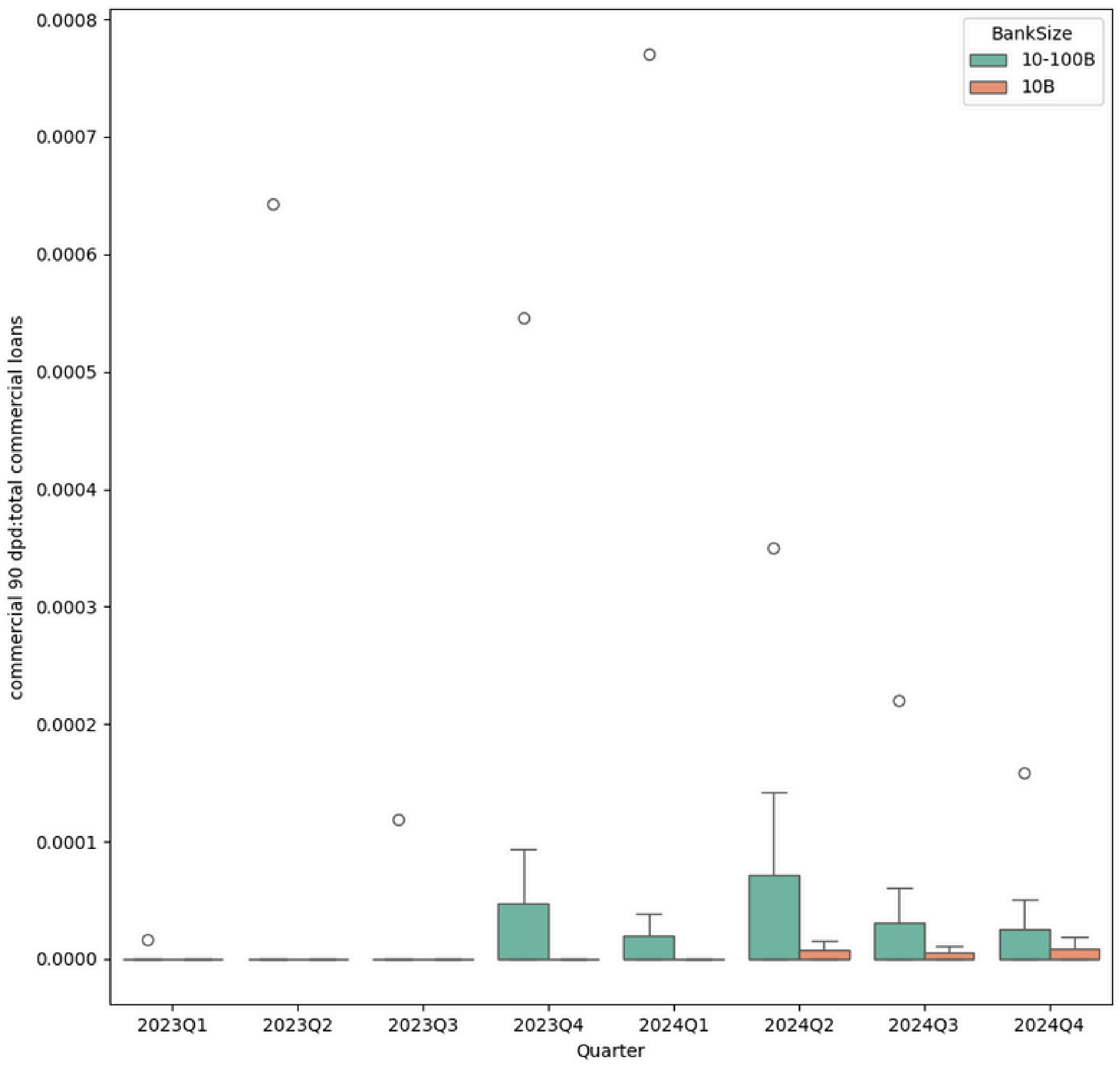
Credit Card (90DPD+) - Bottom 2

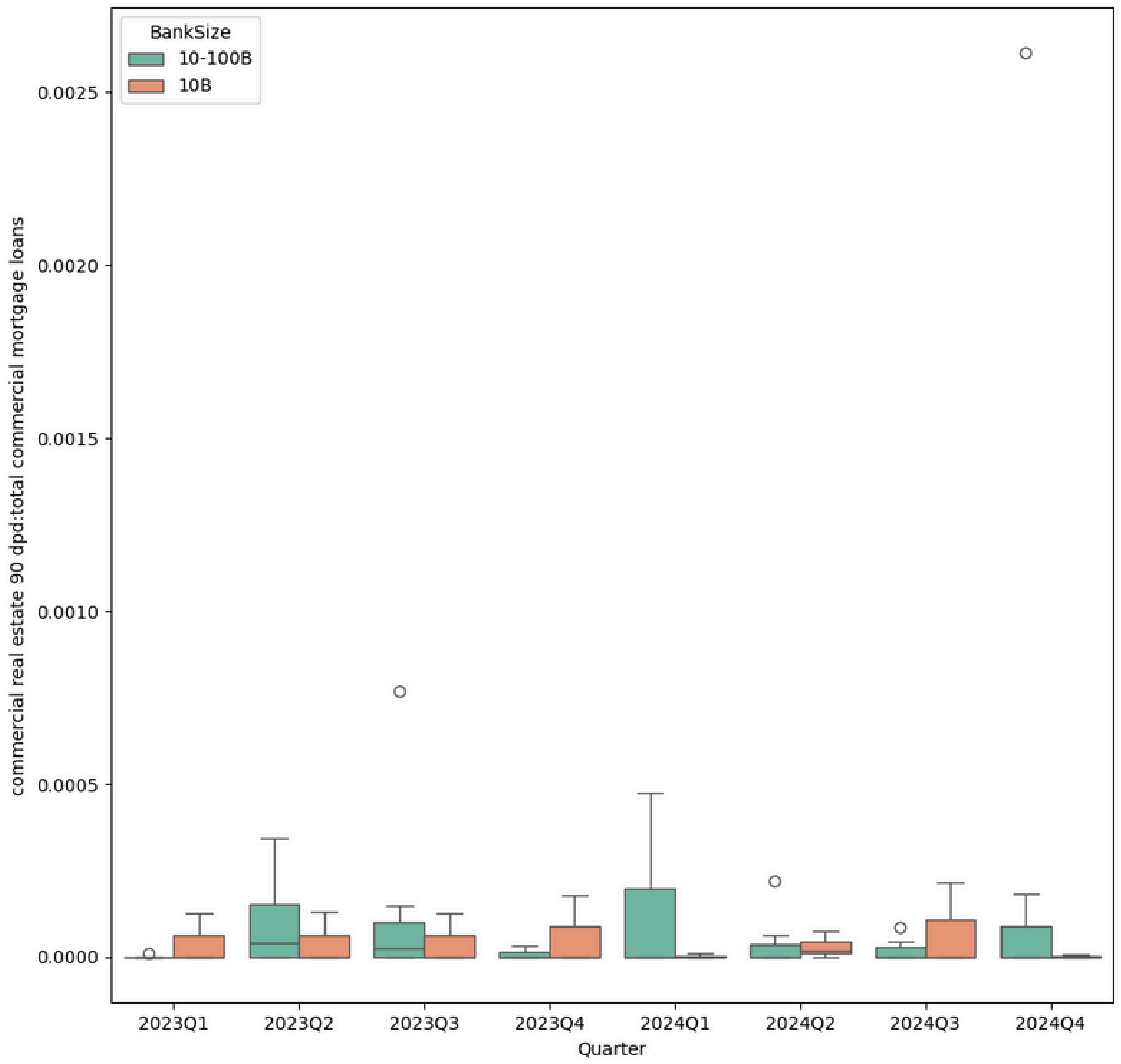


Auto (90DPD+) - Bottom 2



Commercial Portfolios - Bottom 2





A2 - Bank Credit Risk Management Effectiveness

Prompt Output Structure

{"Company": Company,
"Credit Culture & Governance": Score,
"Credit Culture & Governance Score Reason": explanation,
"Credit Risk Identification & Assessment": Score,
"Credit Risk Identification & Assessment Score Reason": explanation,
"Credit Risk Mitigation": Score,
"Credit Risk Mitigation Score Reason": explanation,
"Credit Risk Monitoring & Control": Score,
"Credit Risk Monitoring & Control Score Reason": explanation,
"Loss Provisioning & Capital Adequacy": Score,
"Loss Provisioning & Capital Adequacy Score Reason": explanation,
"Final Score": Score,
"Overall Reason": explanation}

Prompts were developed with Gemini and NotebookLM.
We asked Gemini to identify sections of the report that mention credit management, identify key categories that describe credit quality, and iteratively developed a detailed prompt to extract relevant data.

Credit Quality - Under $10B

Credit Ratings Heatmap - $10B

Company	2023 Q1	2023 Q2	2023 Q3	2024 Q1	2024 Q2	2024 Q3
Amalgamated Financial Corp.	3.6	3.8	3.6	3.8	3.4	3.6
Bank of Marin Bancorp	4	3.6	3.8	3.6	3.2	3.6
Bank of Hawaii Corporation	4	4	4	4	4	4
Byline Bancorp	3.6	3.8	3.6	3.8	3.6	3.8
Camden National Corporation	3.6	3.8	3.4	3.8	3.8	3.8
First Financial Bancorp	3.8	3.6	3.2	3.4	3.6	3.8
Origin Bancorp	3.6	3.6	3.8	4	3.2	3.2
SouthState Corporation	3.6	3.8	3.8	3.8	3.6	3.8
Washington Trust Bancorp	3.6	3.8	3.2	2.8	3.6	3.6
Average	3.7	3.8	3.6	3.7	3.6	3.7

Credit Quality - $10B to $100B

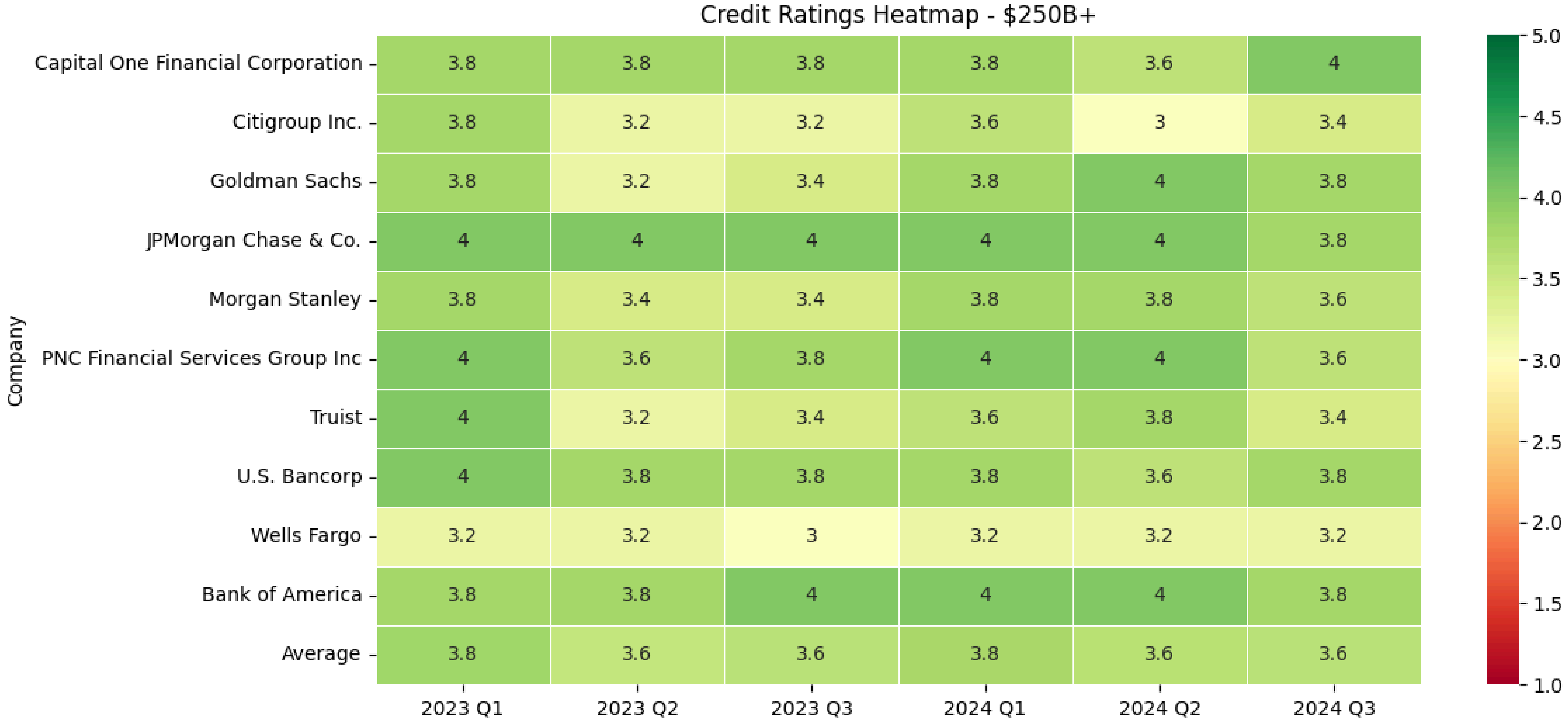
Credit Ratings Heatmap - $10B to $100B

Company	2023 Q1	2023 Q2	2023 Q3	2024 Q1	2024 Q2	2024 Q3
BOK Financial Corp	4	4	4	4	4	4
Comerica Inc	3.8	4	3.6	3.6	4	3.8
East West Bancorp	4	4	4	4	4.2	3.8
First Horizon Corp		3.6	3.6	3.6	3.2	3.6
Prosperity Bancshares	4	3.6	3.6	3.8	3.6	3.6
Pinnacle Financial Partners	4	3.6	4	3.8	4	4
Synovus Financial Corp.	4	3.6	3.8	3.8	3.4	4
UMB Financial Corp	4	4	4	4	3.8	4
Valley National Bancorp	4	3.4	3.4	3.6	3.6	3.6
Western Alliance Bancorp	3.4	3.8	4	4	3.8	3.8
Zions Bancorporation	4	4	4	3.6	4	3.4
Average	3.6	3.8	3.8	3.8	3.8	3.8

Color scale: 1.0 – 5.0

First Horizon Corp did not have data for 2023Q1.

Credit Quality - Above $250B



Average does not contain Goldman Sachs and Morgan Stanley.

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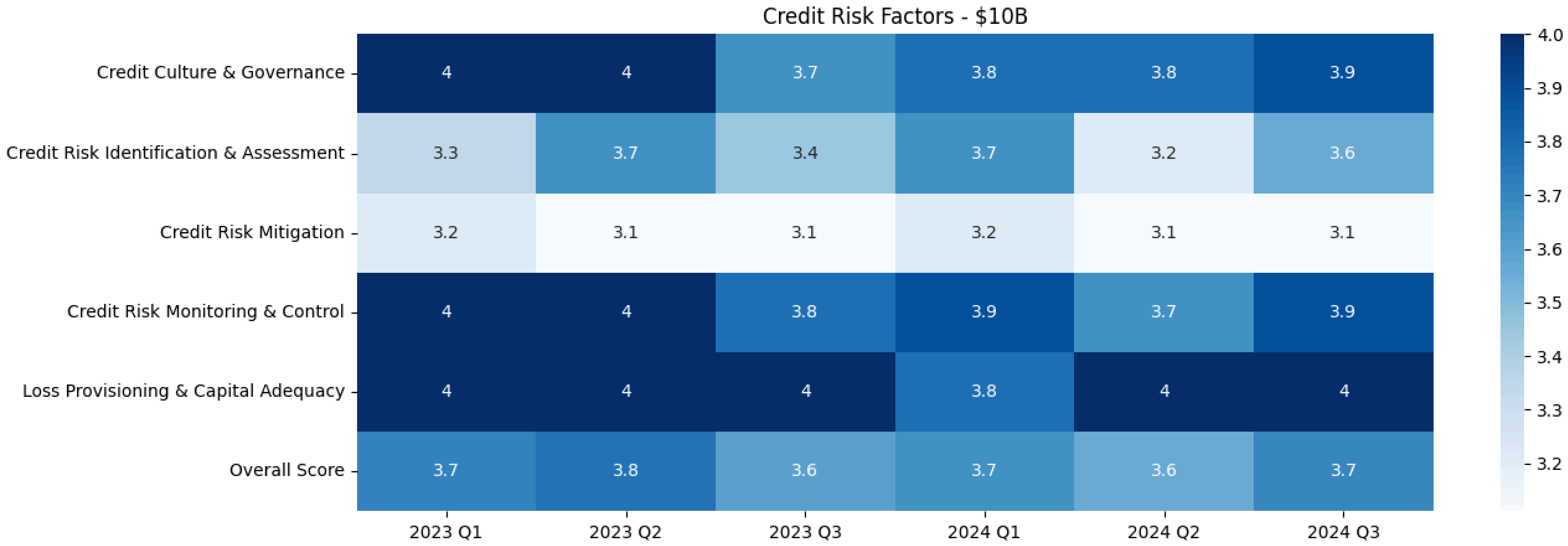
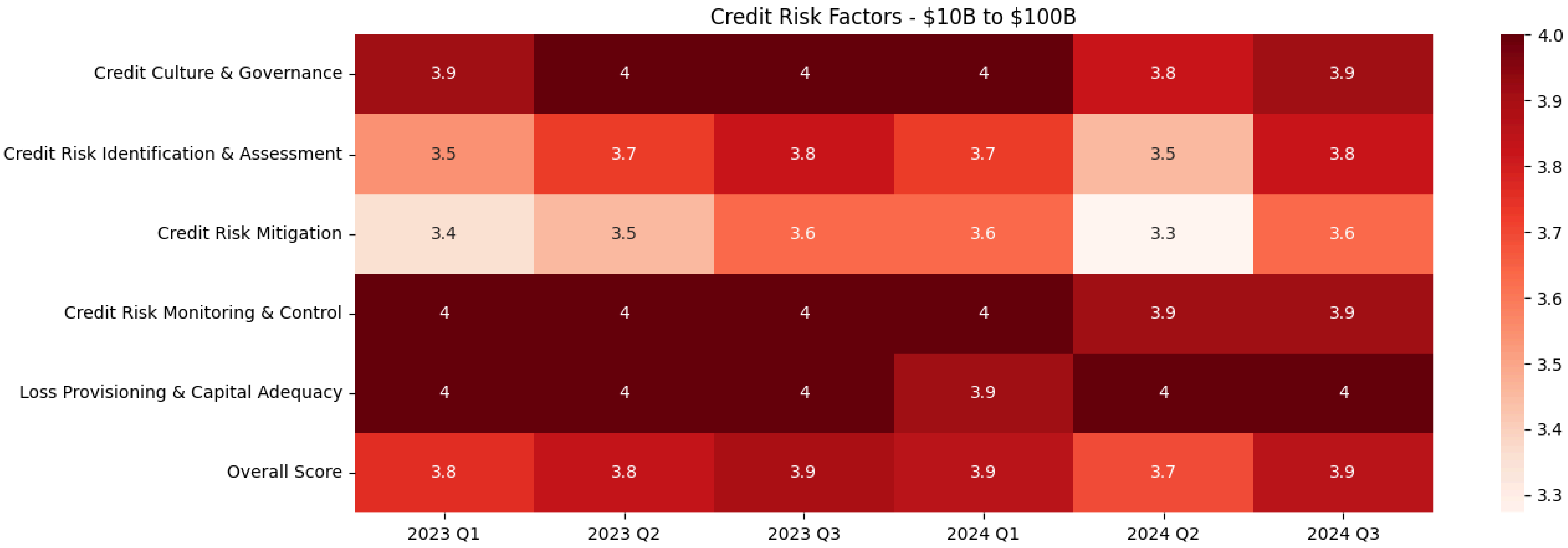
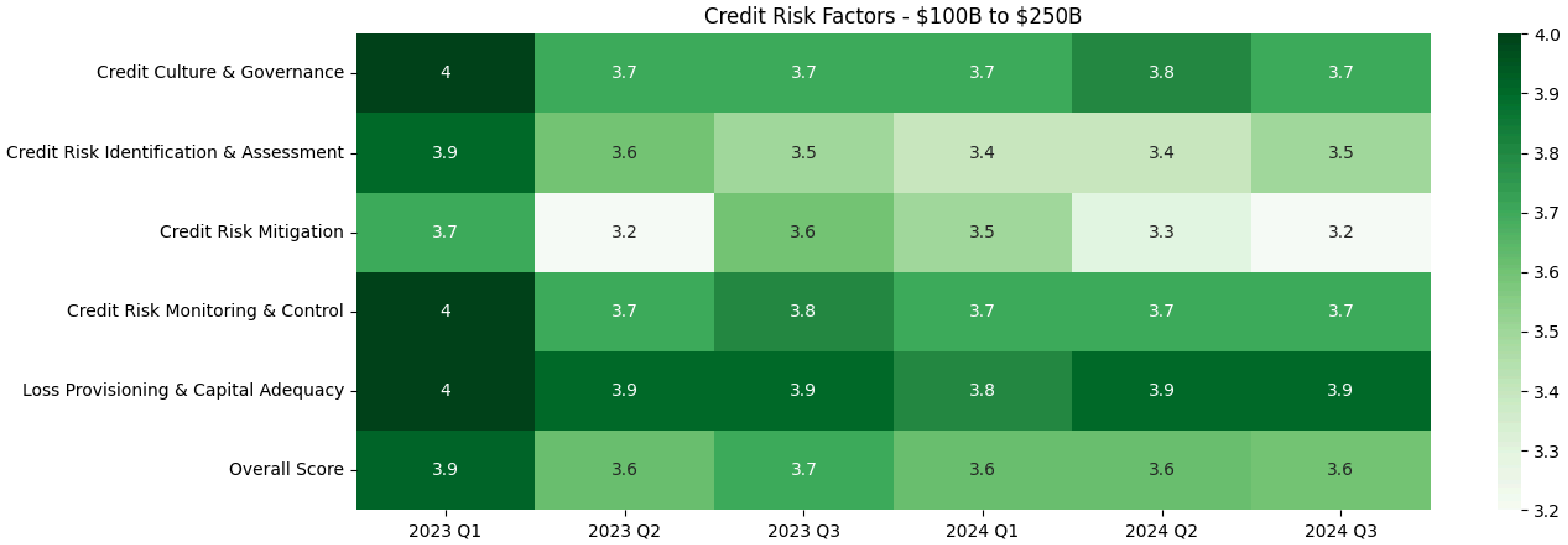
Credit Factors - Under $10B



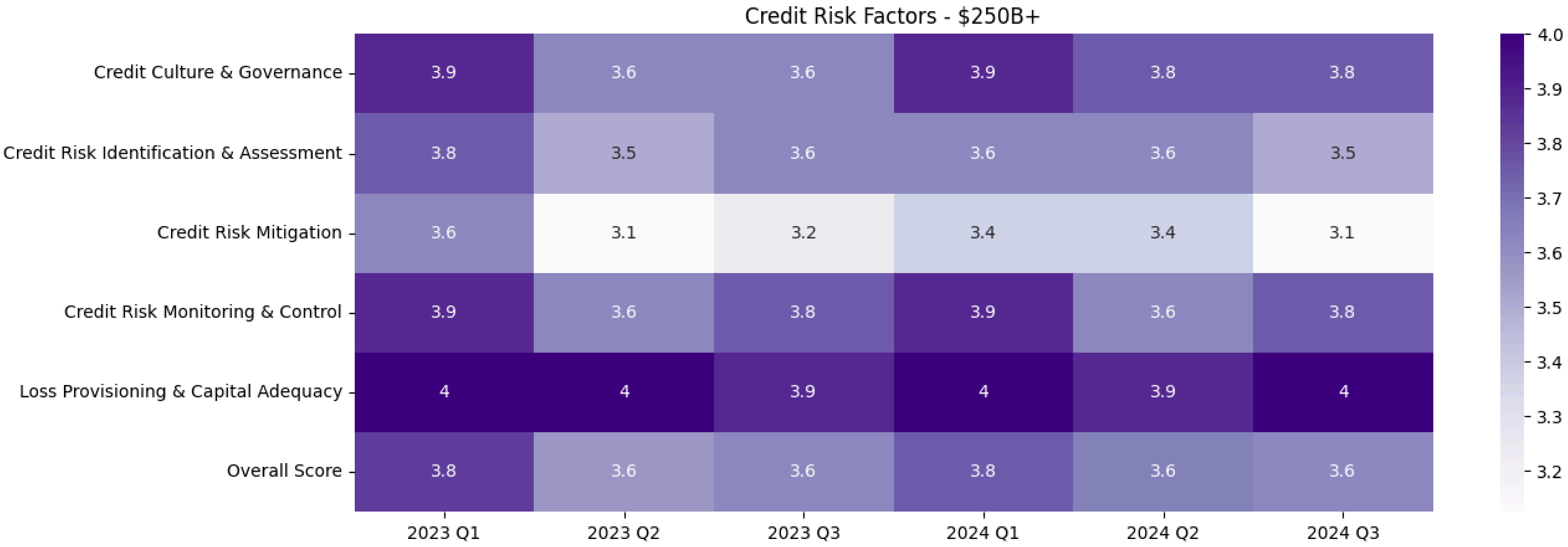
Credit Factors - $10B to $100B



Credit Factors - $100B to $250B



Credit Factors - Above $250B



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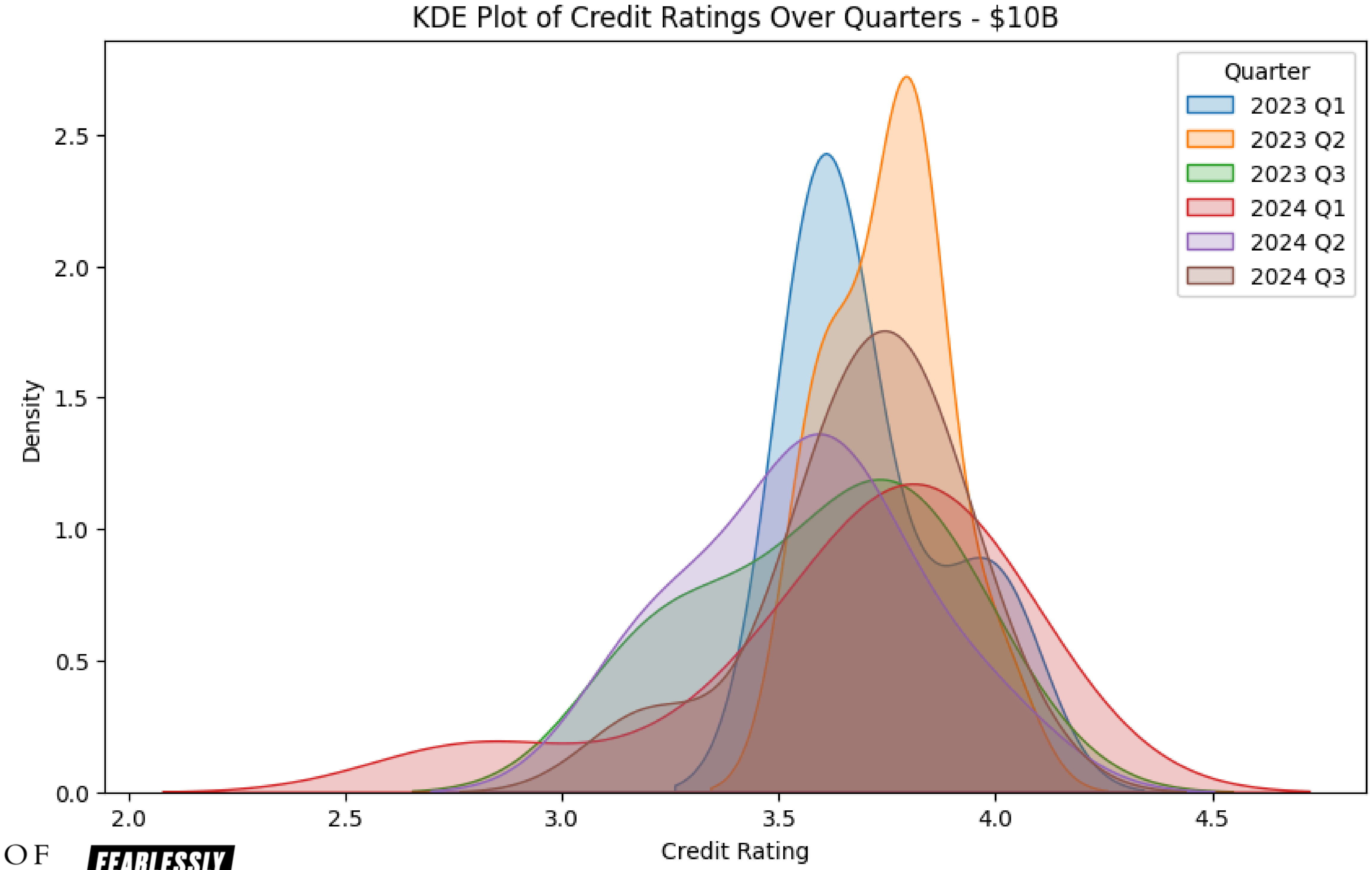
Credit Ratings - $10B



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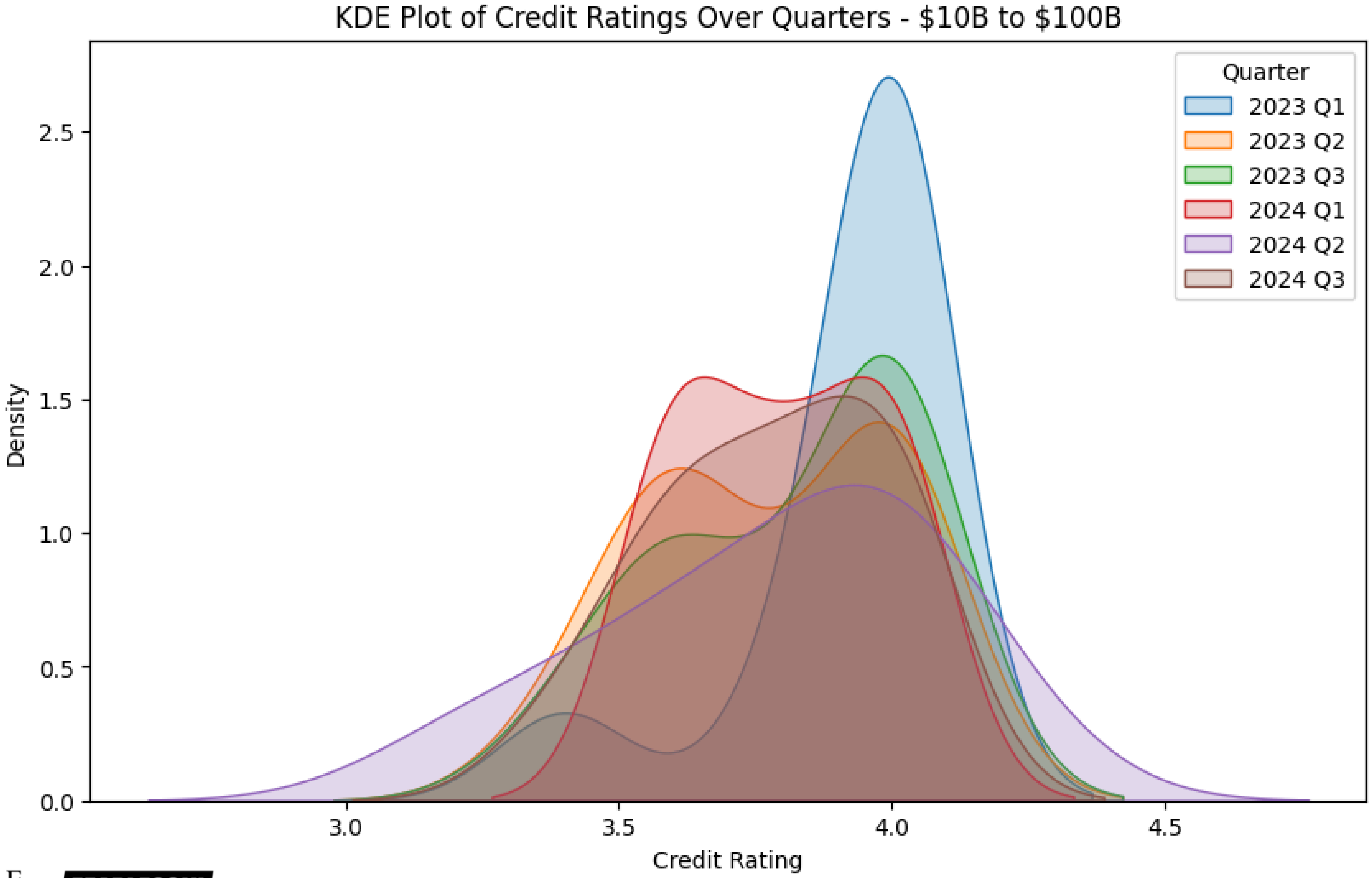
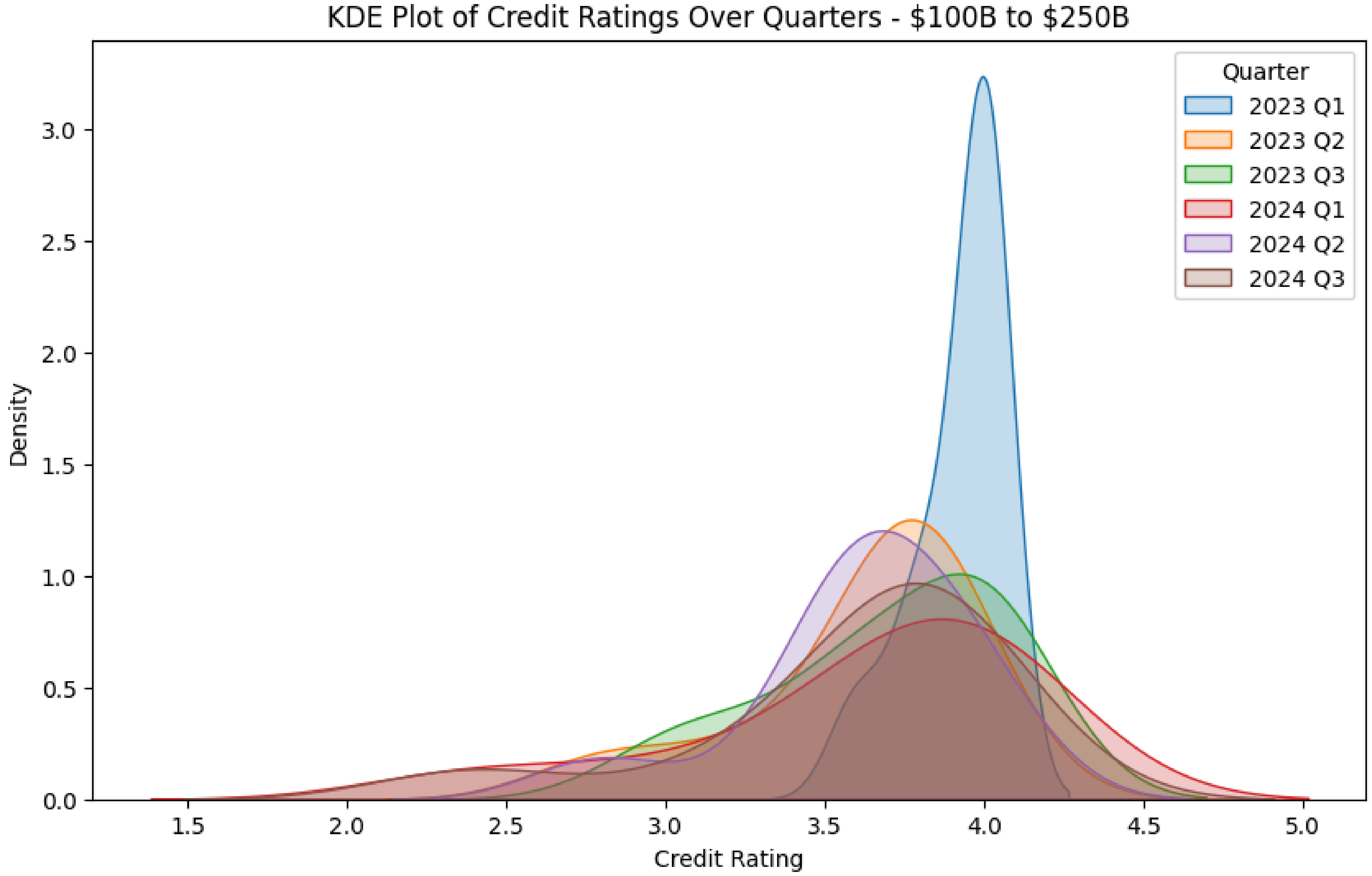
Credit Ratings - $10B to $100B



Credit Ratings - $100B to $250B



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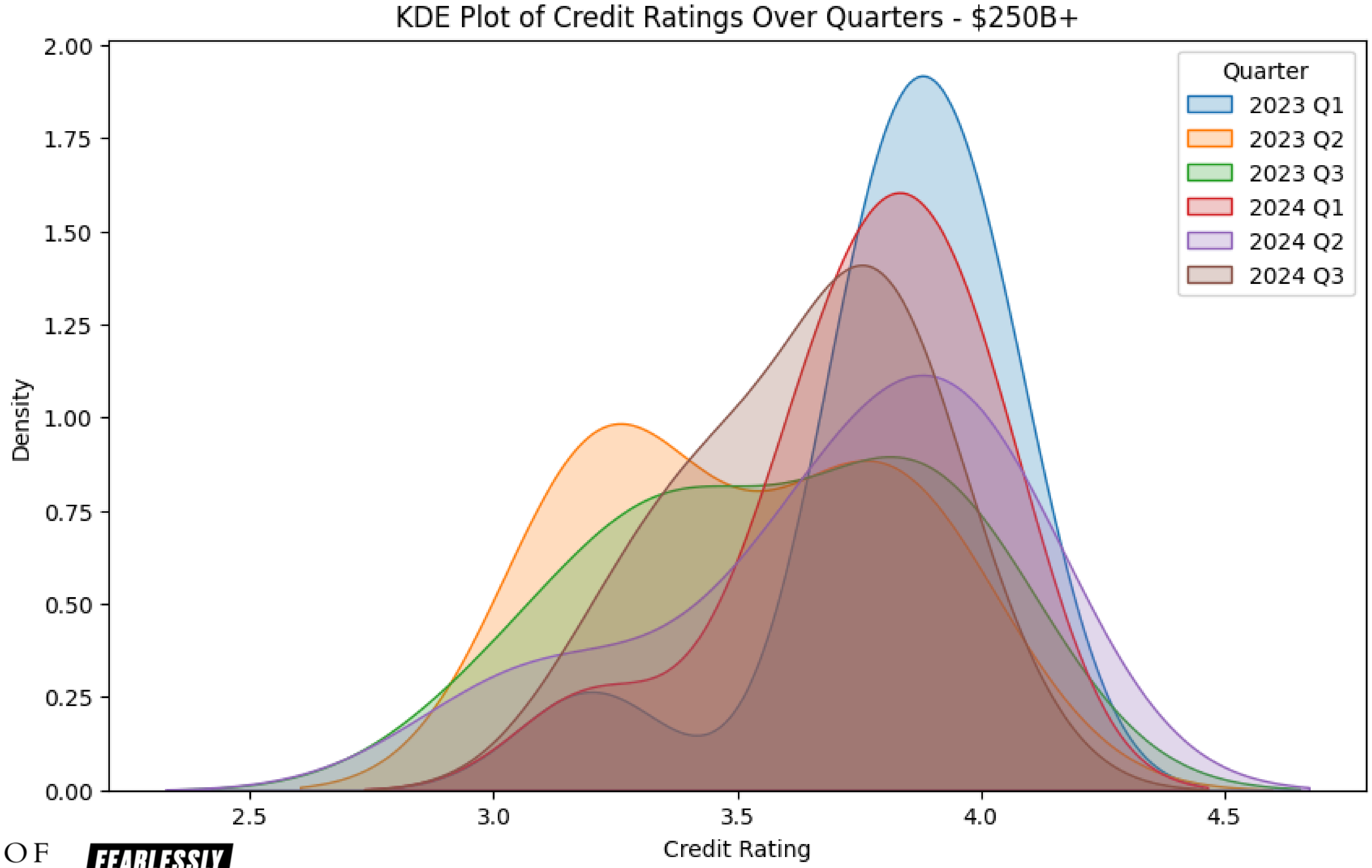
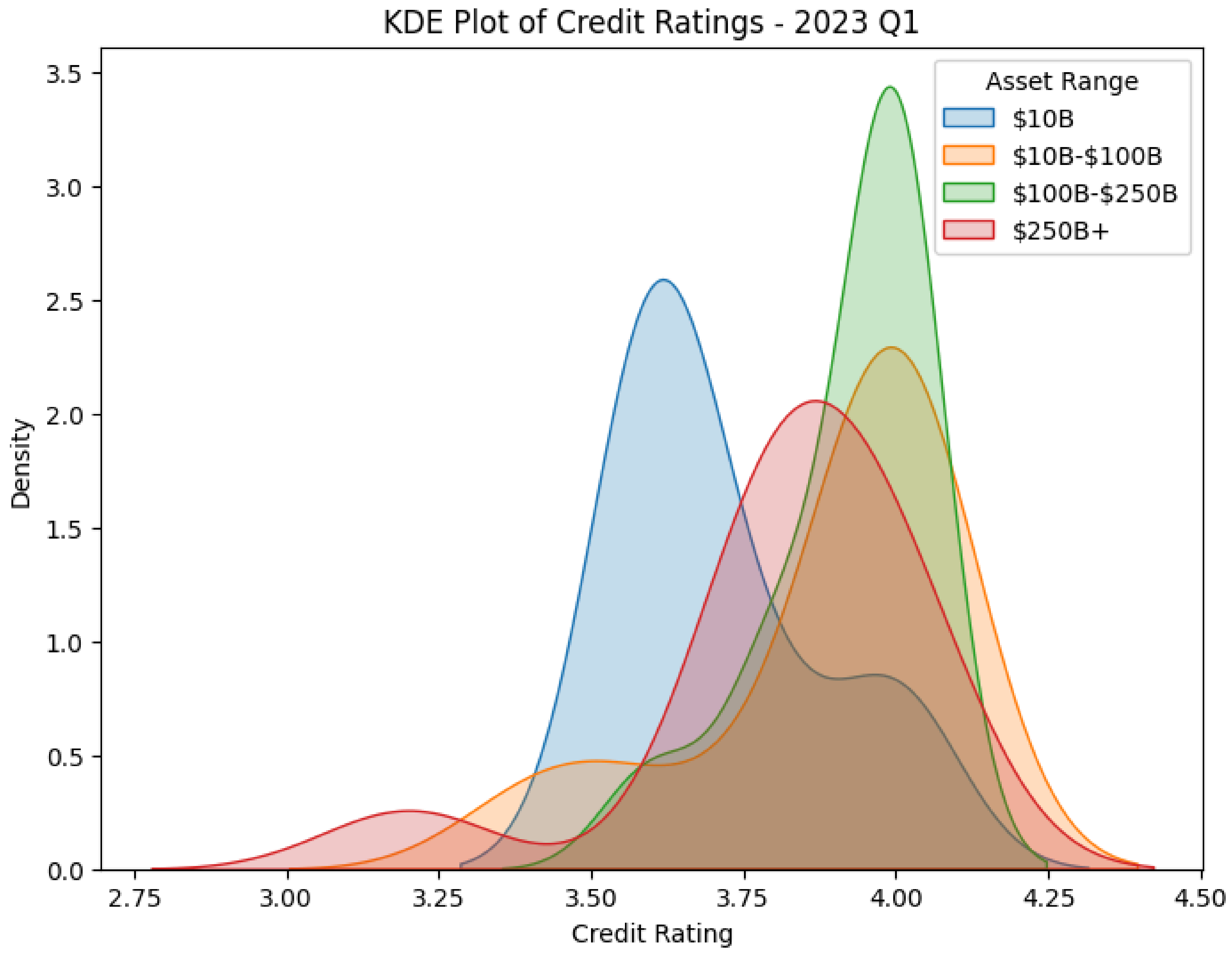
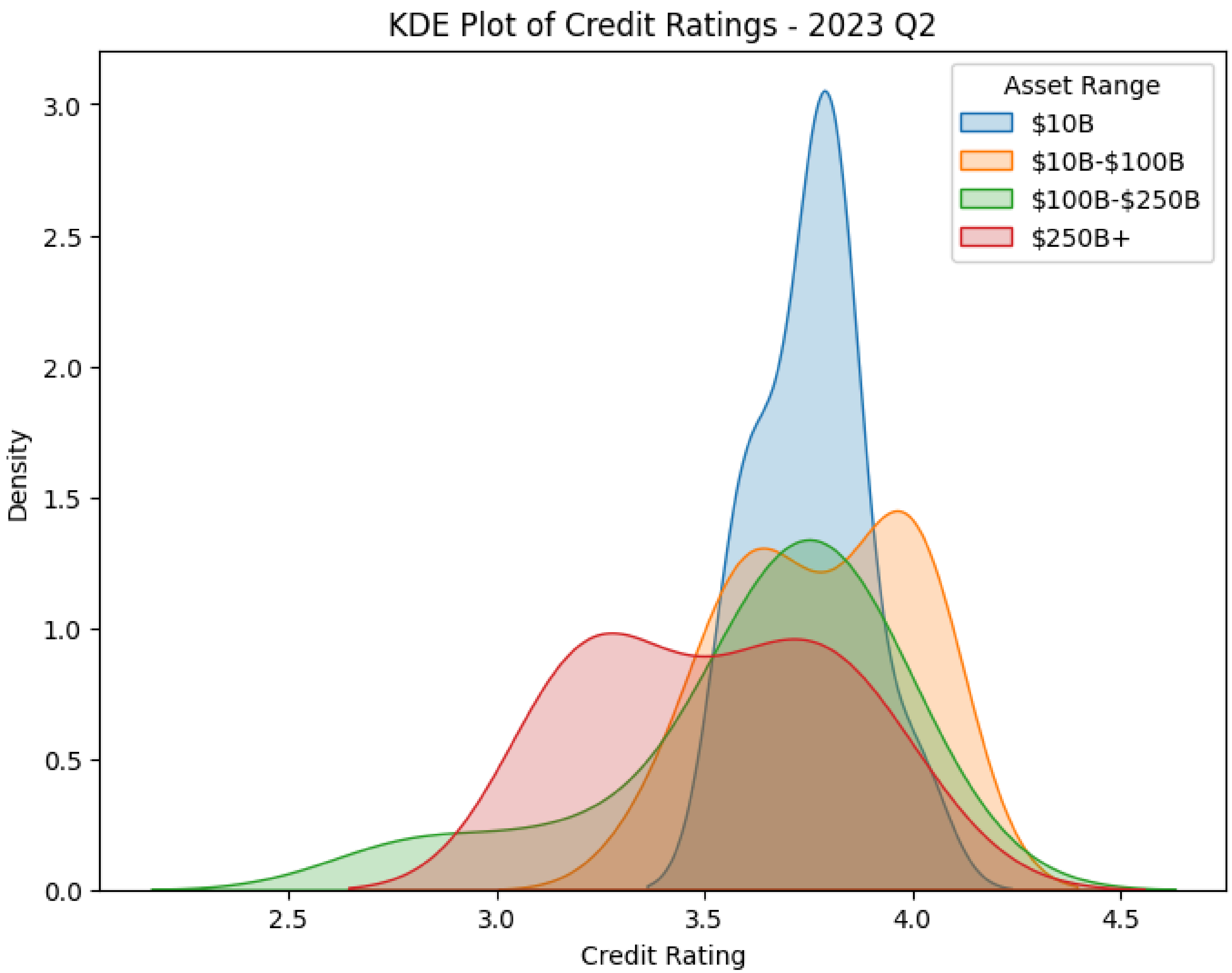
Credit Ratings - Above $250B



Credit Ratings - 2023 Q1



Credit Ratings - 2023 Q2



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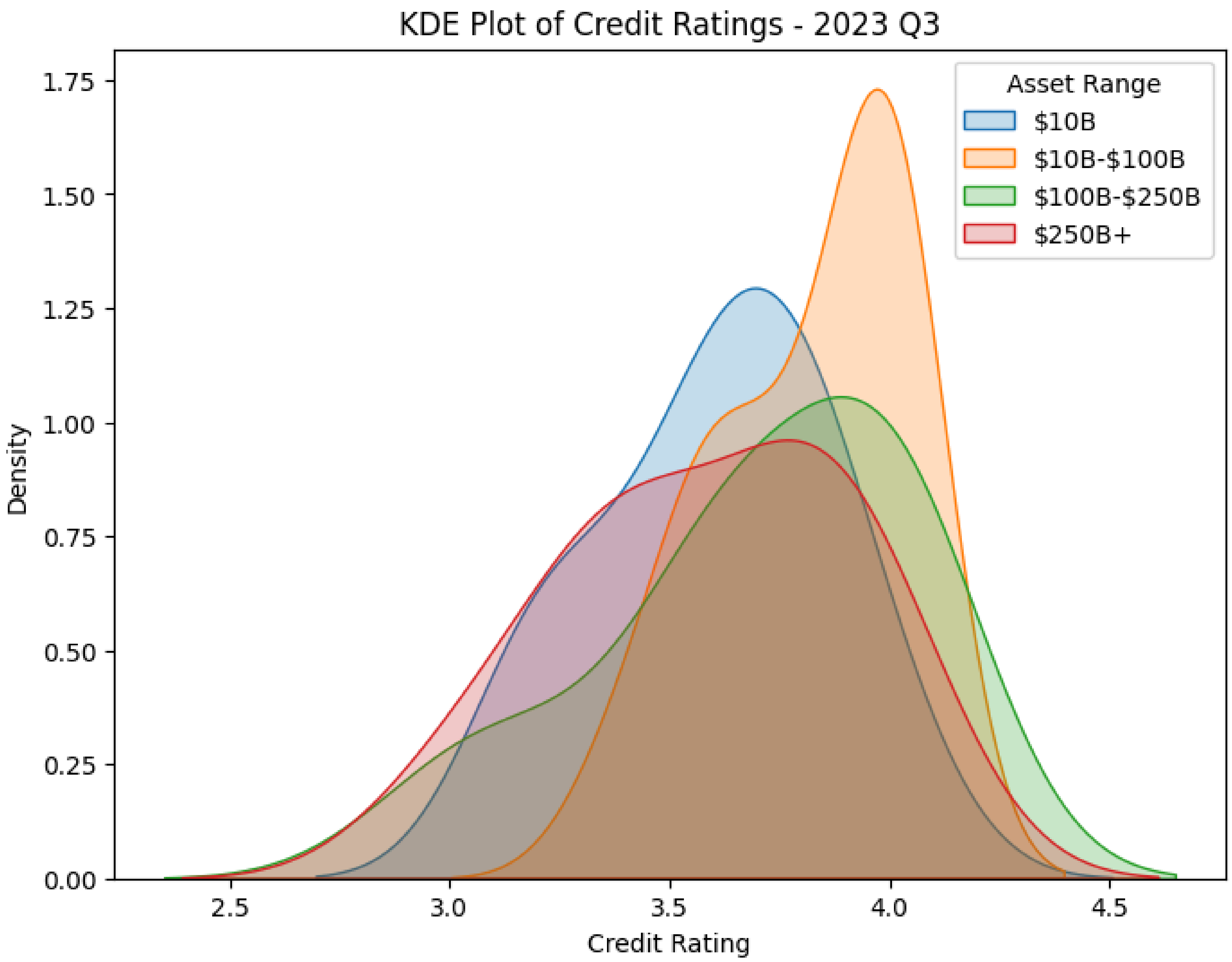
Credit Ratings - 2023 Q3



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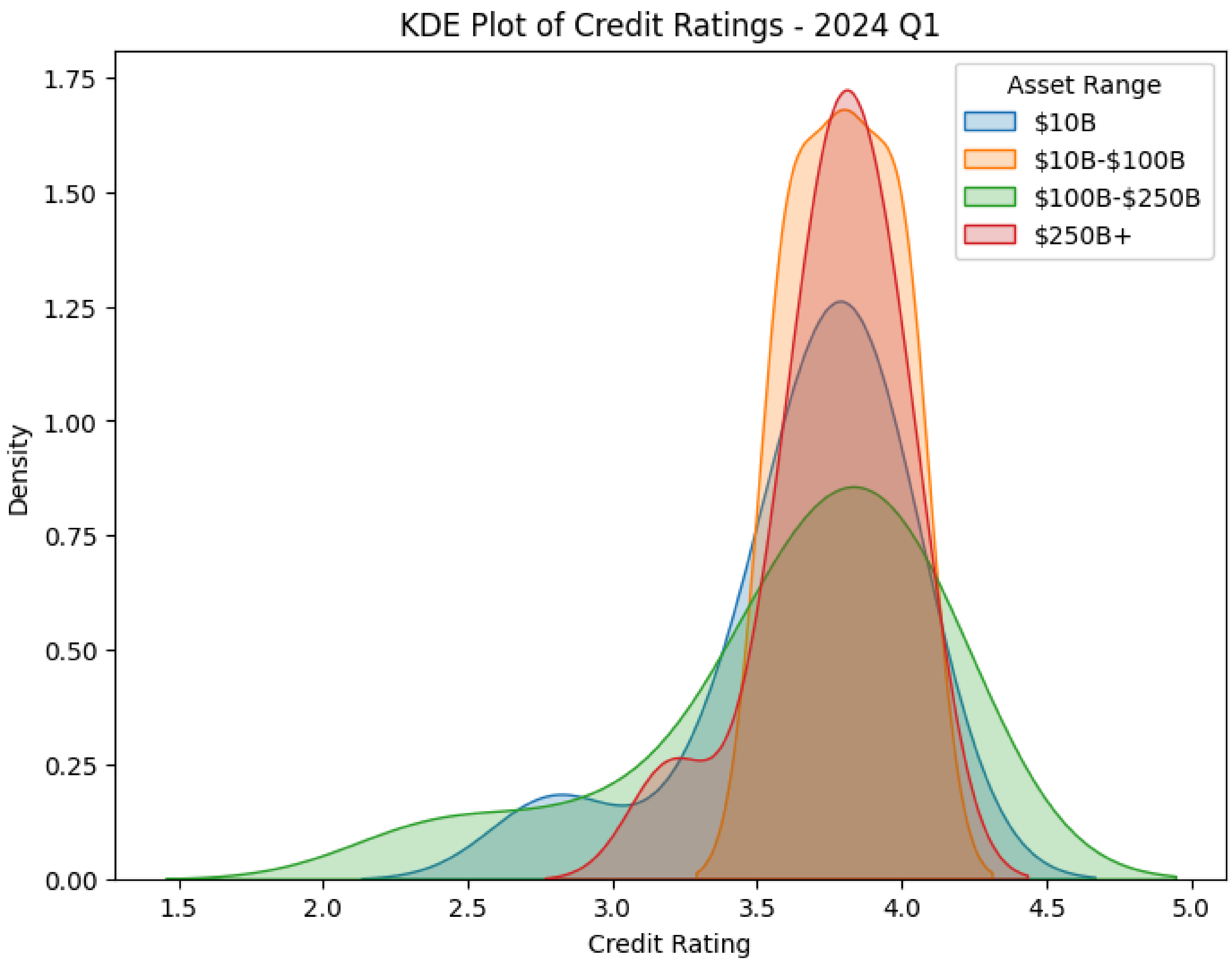
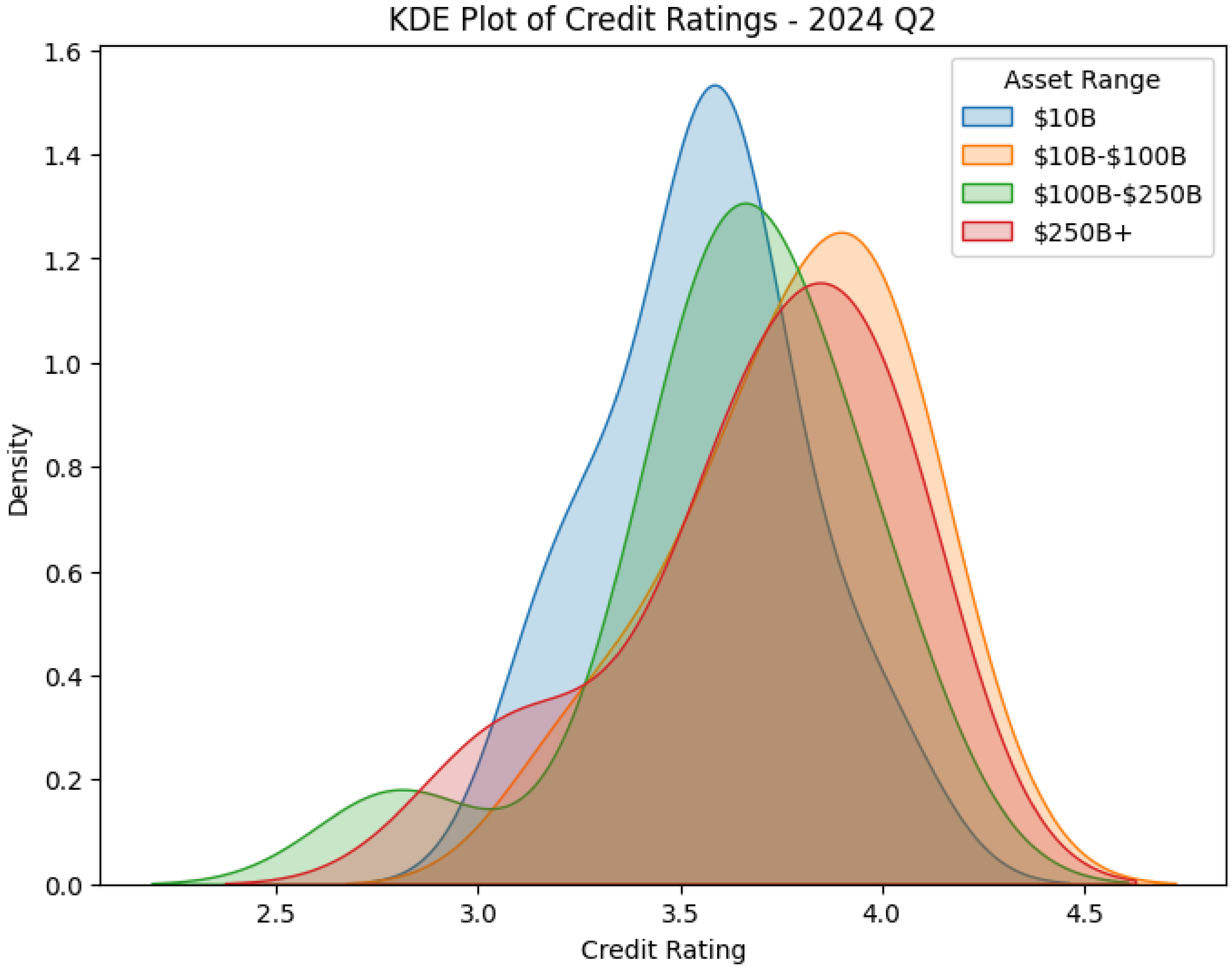
Credit Ratings - 2024 Q1



Credit Ratings - 2024 Q2



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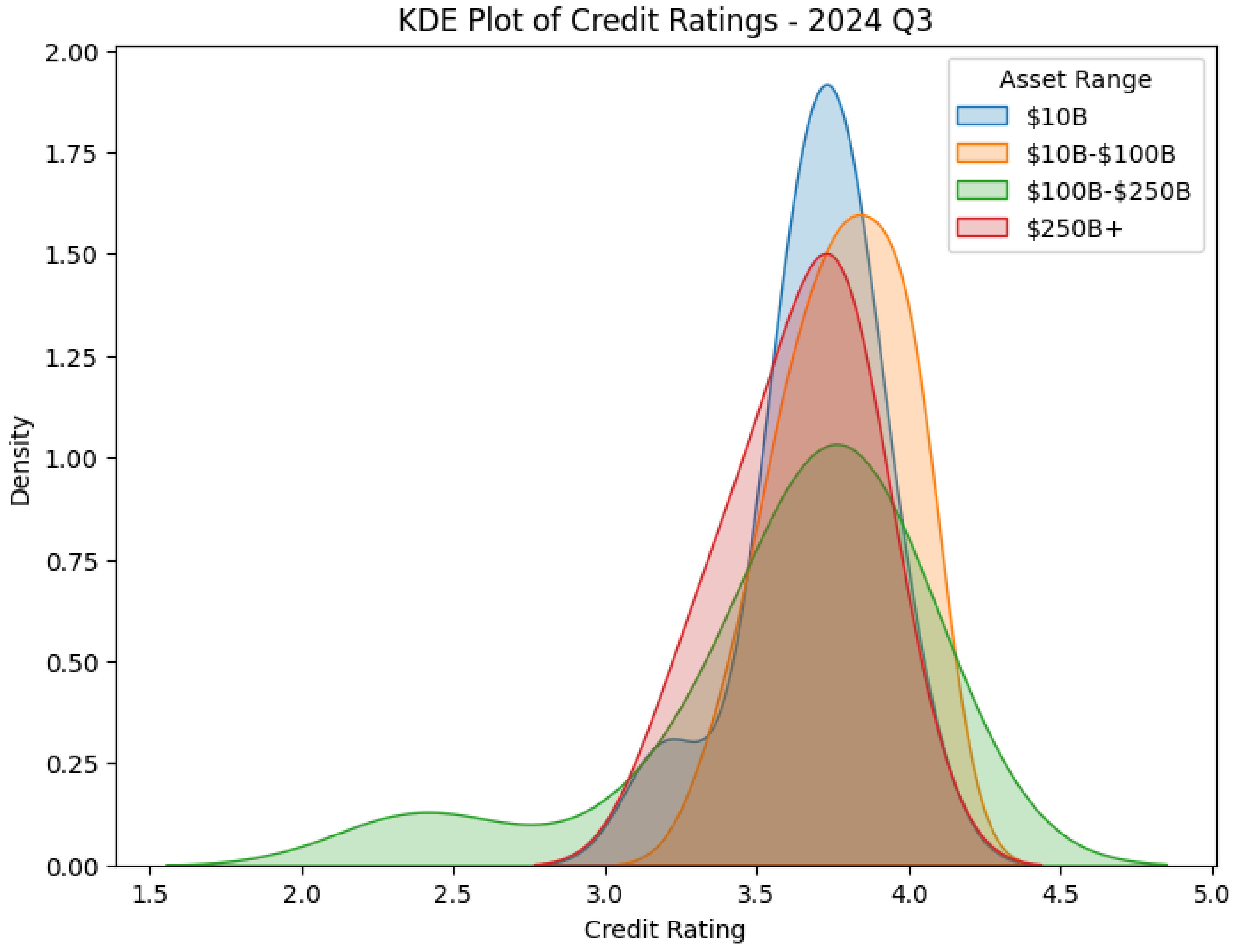
Credit Ratings - 2024 Q3



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A2 - Bank Credit Outlook

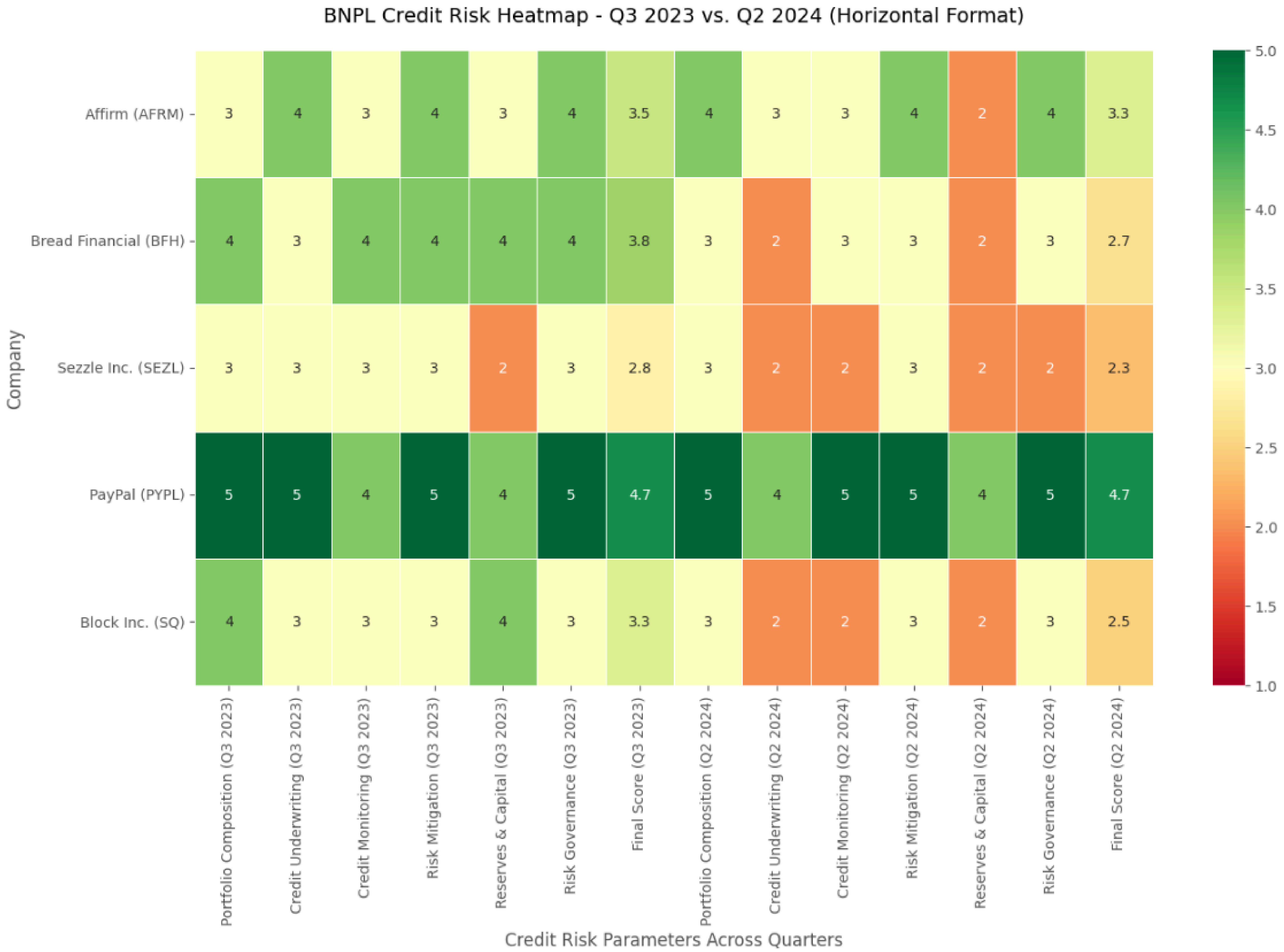
Example Prompt

Credit Outlook: Federal Reserve & Interest Rate Policy: Evaluates how changes in rate policy affect borrowing costs, credit spreads, and the overall risk environment for lenders.
Inflation & Credit Market Conditions: Assesses the impact of inflation on asset quality, borrower credit profiles, and cost of capital, influencing default probabilities and credit demand.
GDP Growth & Unemployment Trends: Considers how economic expansion or contraction, and employment conditions, affect corporate earnings, borrower repayment capacity, and overall credit risk.
Geopolitical & Trade Risks: Analyzes the effect of global instability, trade policy shifts, and regulatory changes on credit market confidence and risk premiums.
Market Sentiment & Investor Confidence: Reviews shifts in investor behavior and market risk appetite that can influence credit spreads, lending standards, and capital availability.
Sentiment Ratings:
5 - Optimistic (Favorable Credit Conditions & Resilient Borrower Performance):
Keywords: "Strong credit fundamentals," "low default risk," "favorable interest rate environment," "robust borrower repayment capacity," "expanding credit demand," "stable asset quality," "narrow credit spreads," "supportive regulatory environment," "healthy liquidity levels," "resilient earnings profiles."

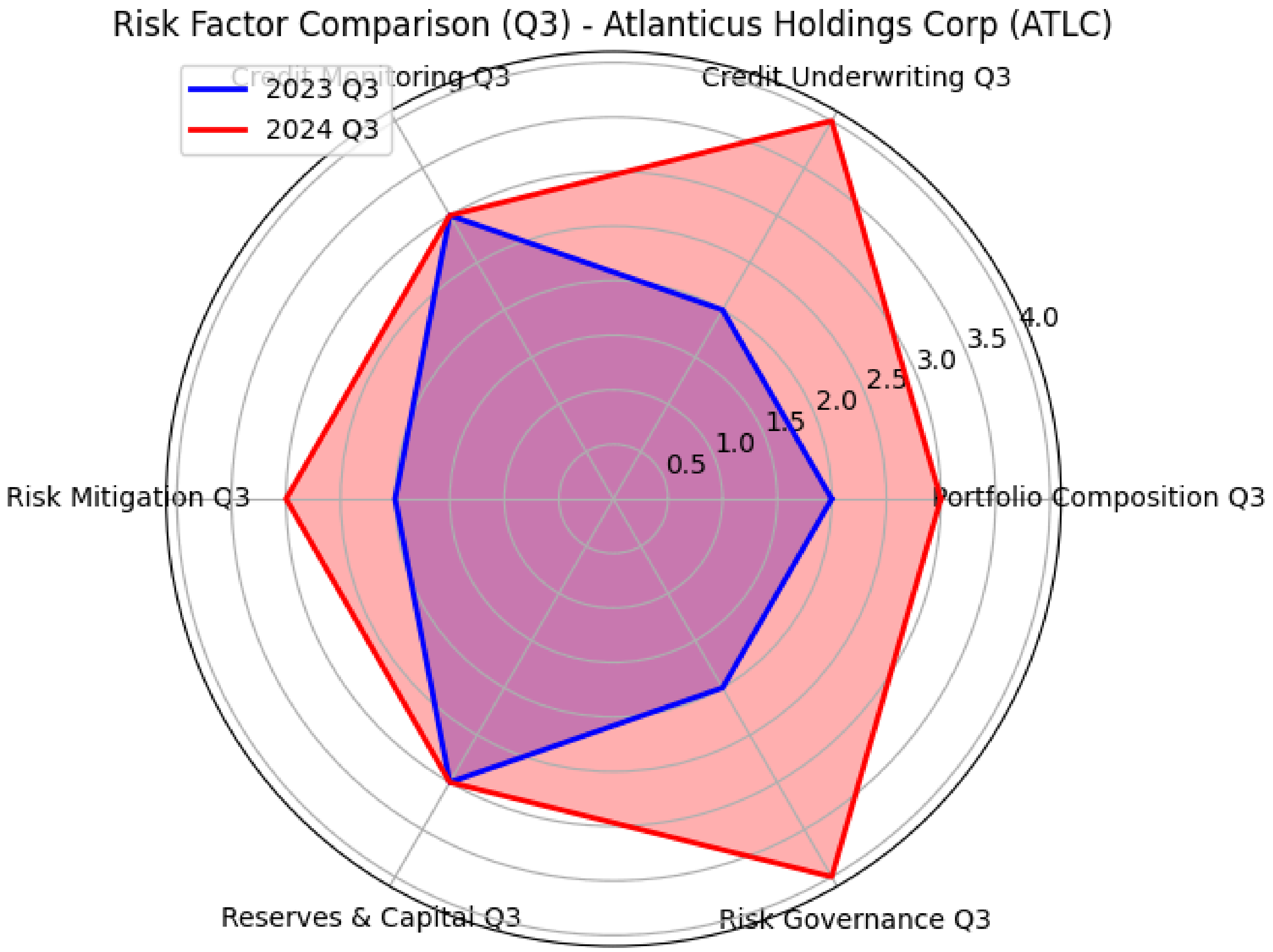
A4 - Fintech Credit Risk Management Effectiveness

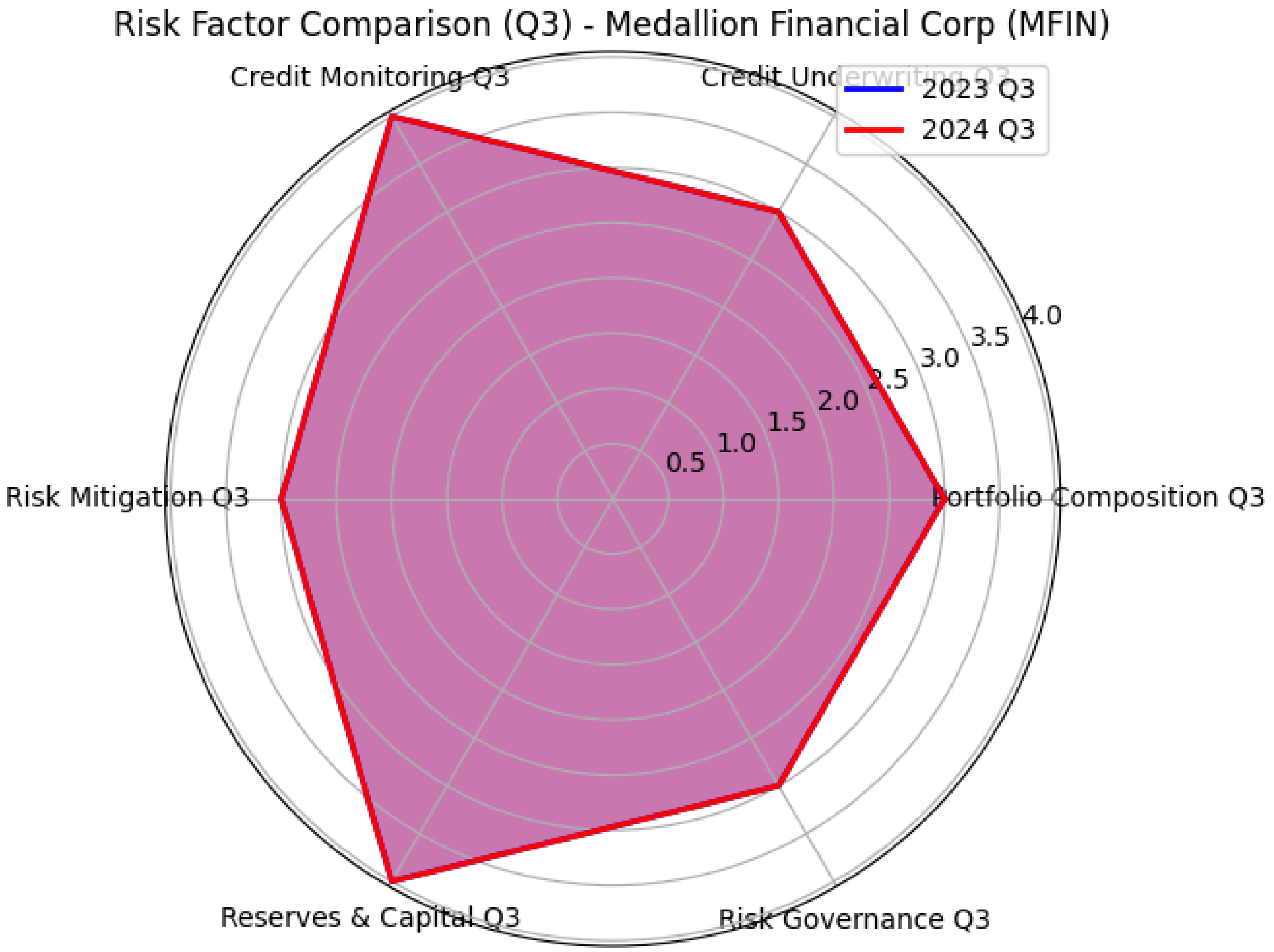
Personal Loans Sensitivity Analysis

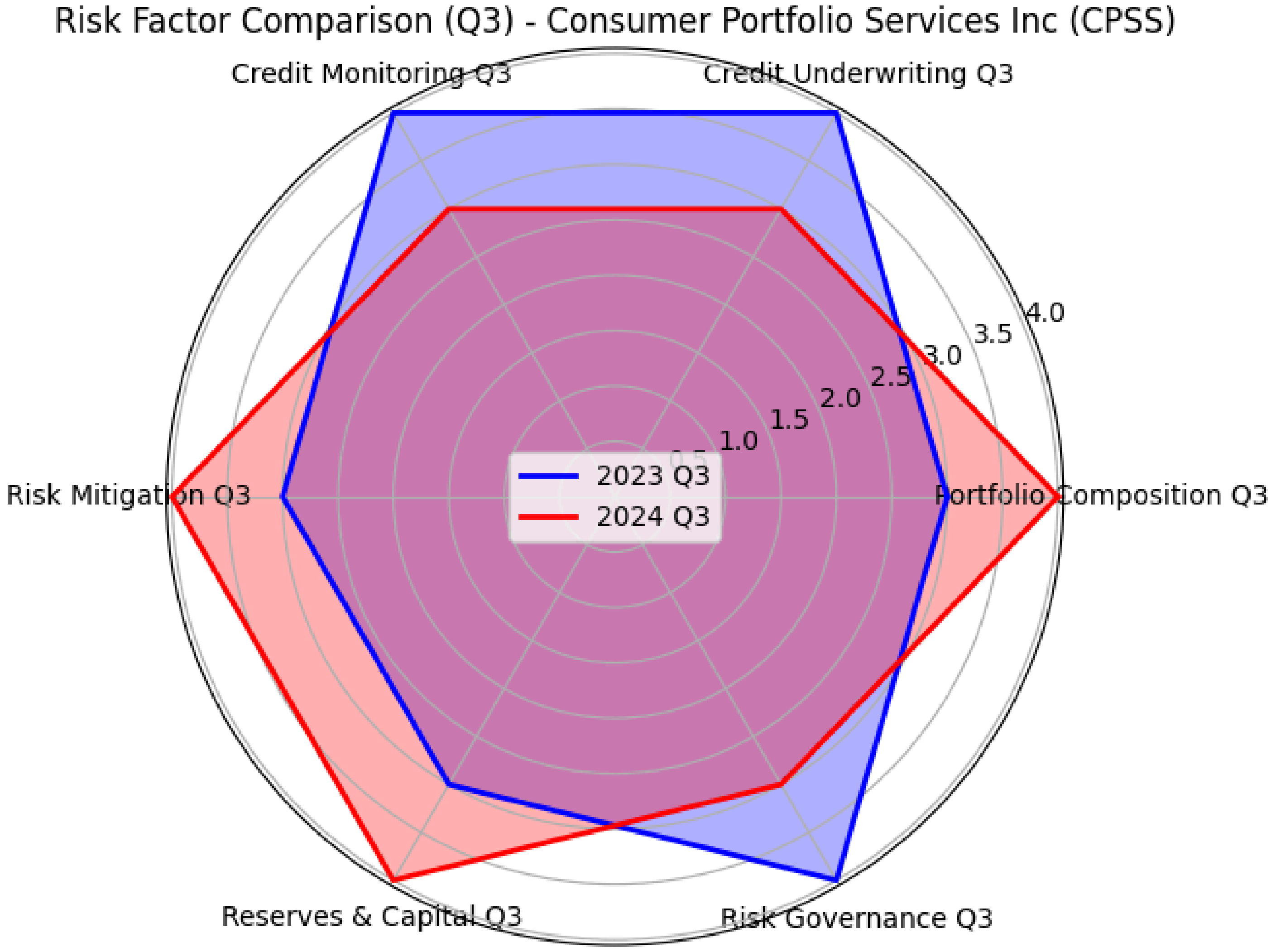
BNPL Sensitivity Analysis

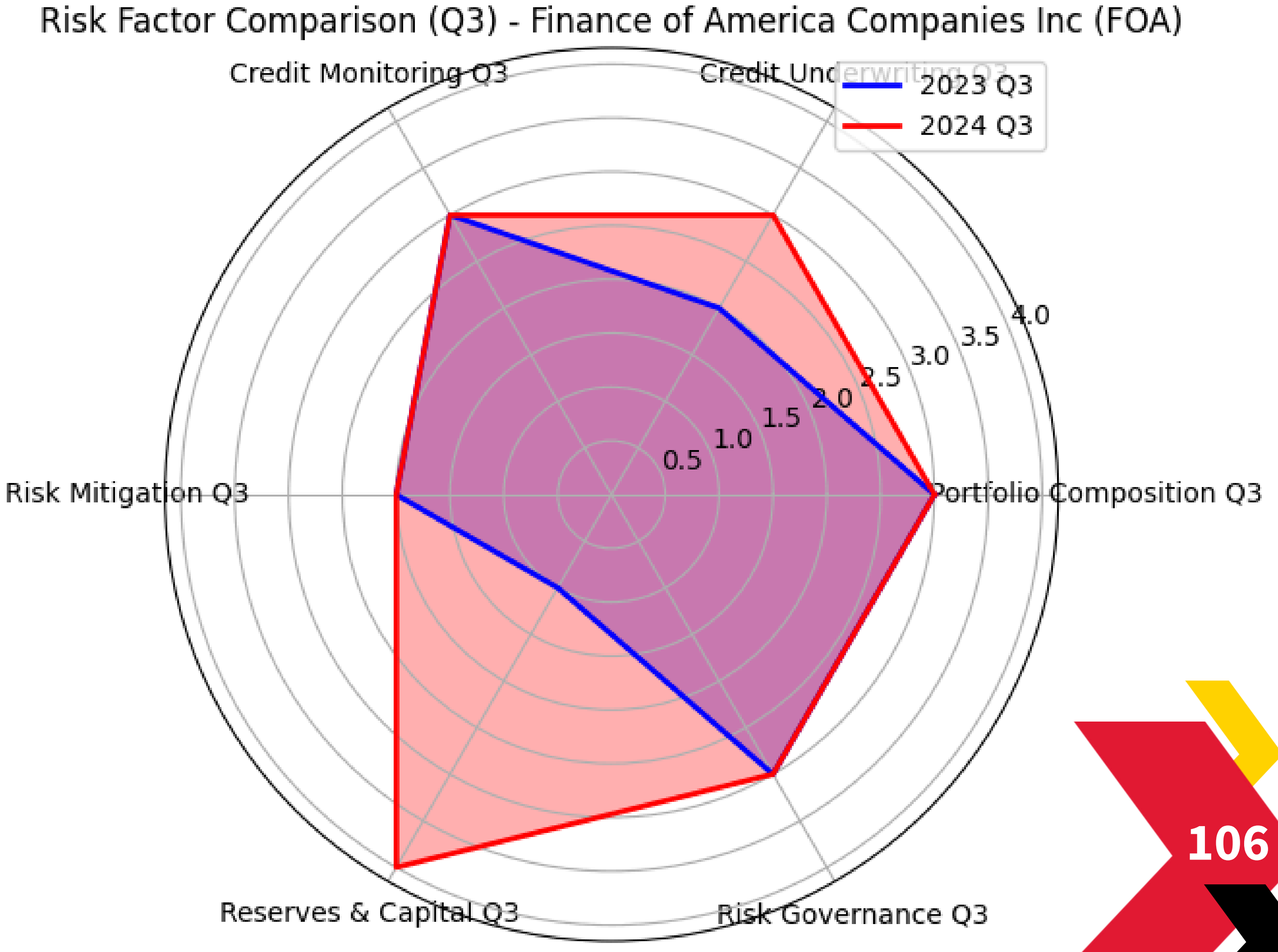


Q3 Radar Charts

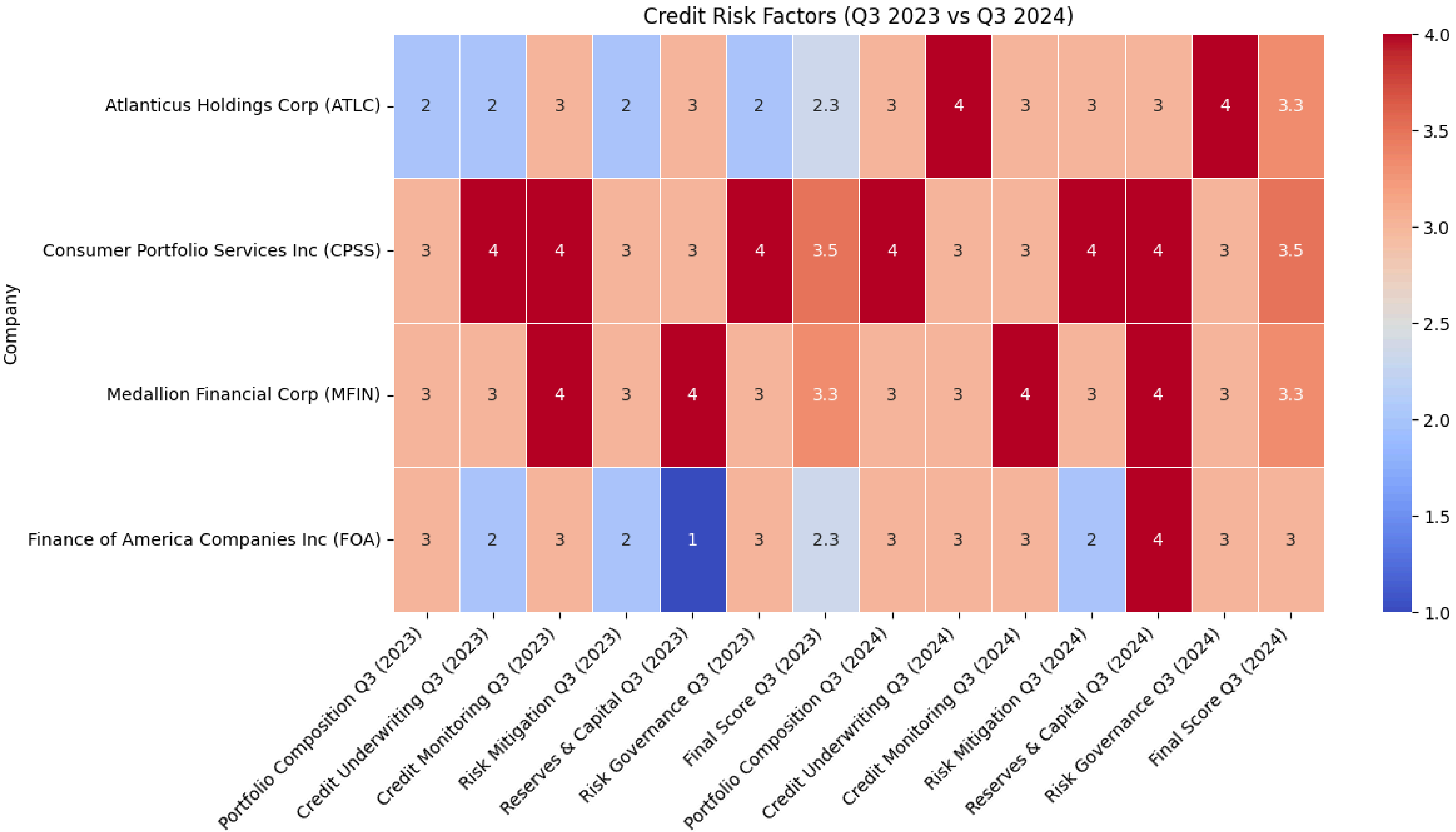








Credit Risk Factor Heat Map



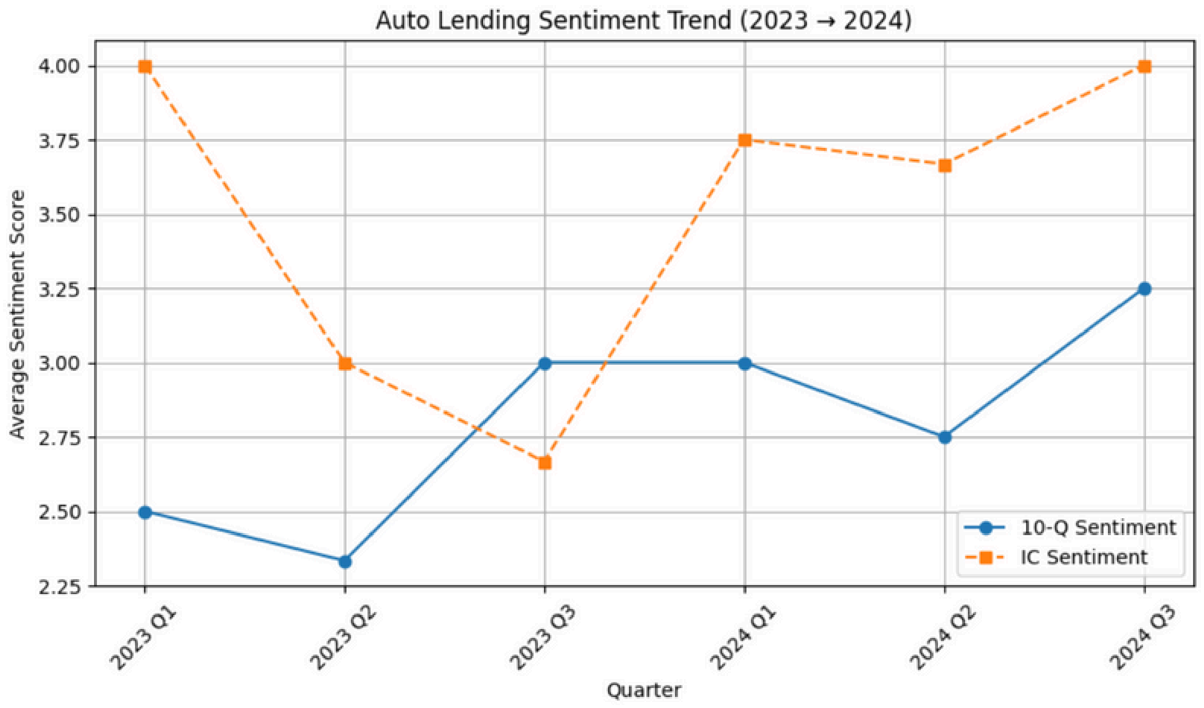
A5 - Fintech Credit Outlook

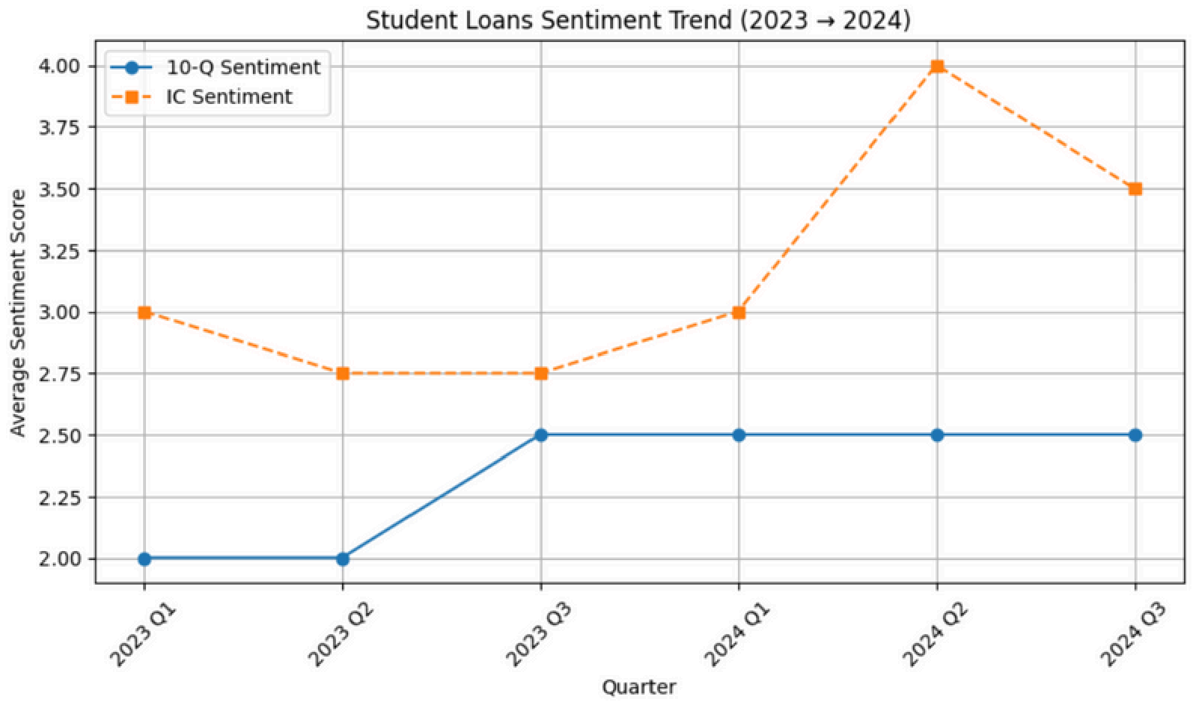
Excel Output

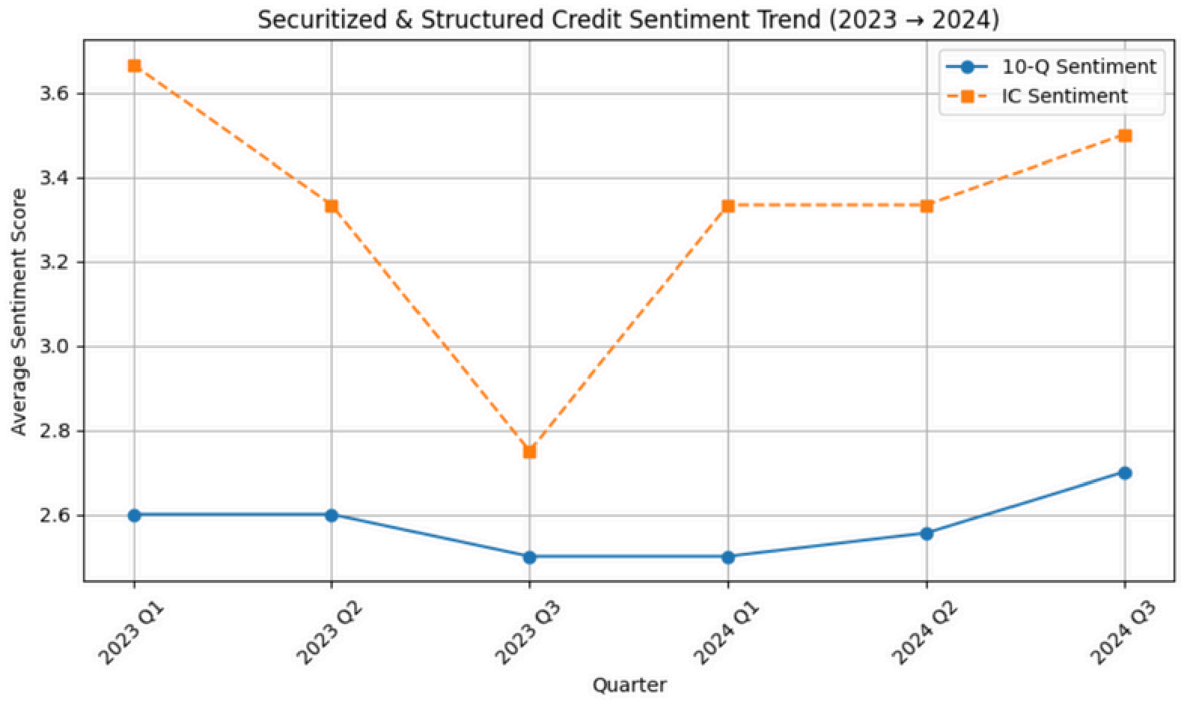
Company	Quarter	Forward-Looking Overall Sentiment_10Q	BNPL/POS Financing_10Q	Credit Card Loans_10Q	Auto Lending_10Q	Real Estate Lending_10Q	Securitized & Structured Credit_10Q	Personal Loans_10Q	Student Loans_10Q	Forward-Looking Statements & Risk Factors_10Q
AFRM	Q1 2023	2	2				3	2		* Forward-looking 1: Management discusses the potential imp Forward-looking 2: The report mentions the continued grow Risk Factor 1: The company acknowledges the risk of increas Risk Factor 2: The report highlights the reliance on a small nu
BFH	Q1 2023	2	2	2			3	2		* Forward-looking 1: The company anticipates mid-single-digit Forward-looking 2: Bread Financial expects a full-year 2023 r Risk Factor 1: The company anticipates a net loss rate of appr Risk Factor 2: Management acknowledges "softening econo
CPSS	Q1 2023	2			2		2			* Forward-looking 1: Management acknowledges the risk of w Forward-looking 2: The company's discussion of its allowanc Risk Factor 1: The company's substantial indebtedness (Page Risk Factor 2: The discussion of potential future charge-offs a
ENVA	Q1 2023	3					3	2		* Forward-looking 1: Management discusses the impact of ma Forward-looking 2: The report mentions the successful applic Risk Factor 1: The macroeconomic environment (inflation, re Risk Factor 2: The report highlights increased delinquency rat
FOA	Q1 2023	2				2	2			* Forward-looking 1: The acquisition of AAG/Bloom is expecte Forward-looking 2: The company anticipates successfully inte Risk Factor 1: The company's ability to obtain sufficient capit Risk Factor 2: The report expresses concern over the impact
MFIN	Q1 2023	3						4		* Forward-looking 1: Management discusses the positive impa Forward-looking 2: Management acknowledges the potentia Risk Factor 1: The ongoing SEC litigation poses a significant ri Risk Factor 2: The medallion loan portfolio remains a signific

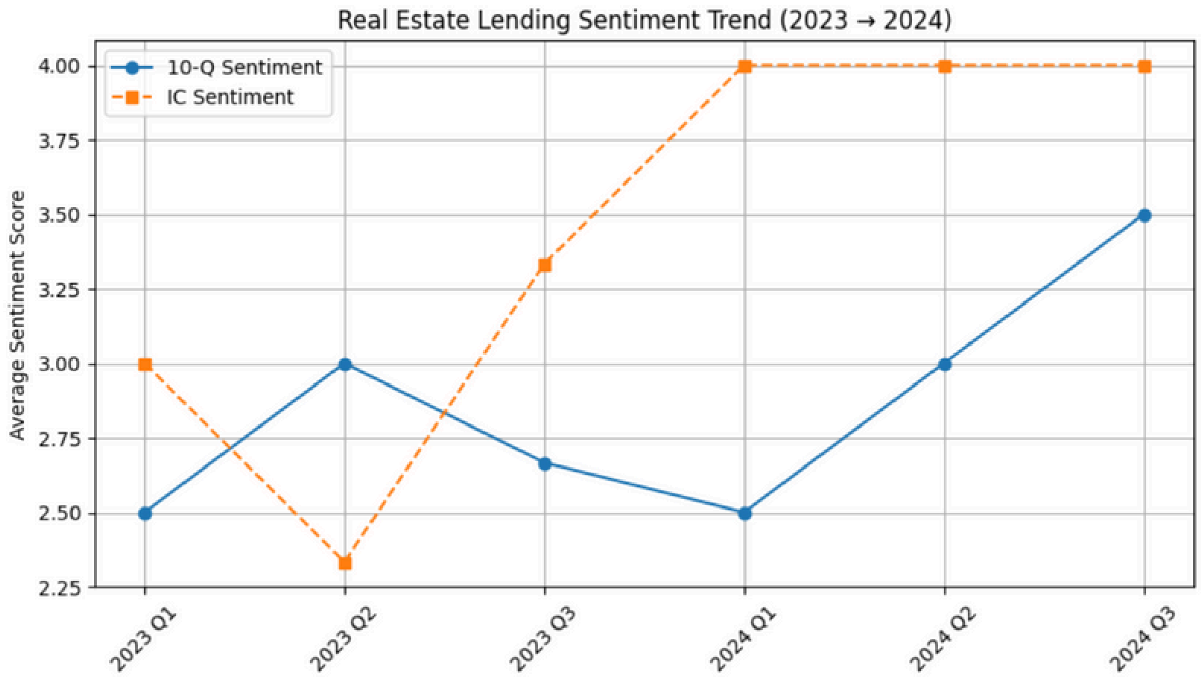
Link to the output: https://docs.google.com/spreadsheets/d/1ZB2_K68voAAMjLMb33WnPU0MJraKMPcR/edit?gid=1487593776#gid=1487593776

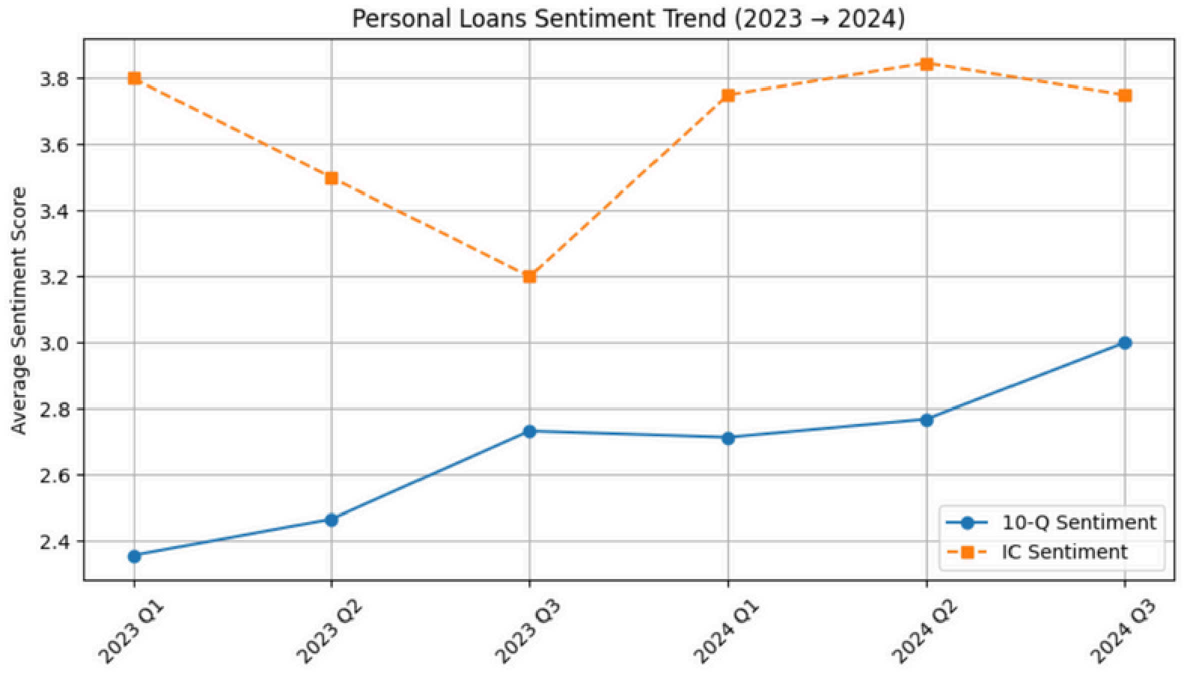
Sentiment Trend per Segment











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FEARLESSLY FORWARD

2023 vs 2024 Score per Segment