Video Link:
https://drive.google.com/file/d/1wMqXZTPm1dC9SKGPfJacjq4Dac1G2kBO/view?usp=sharing

How do customers interact with different account types (e.g., savings, current, credit)?

Average Transaction Amount by Account Type:

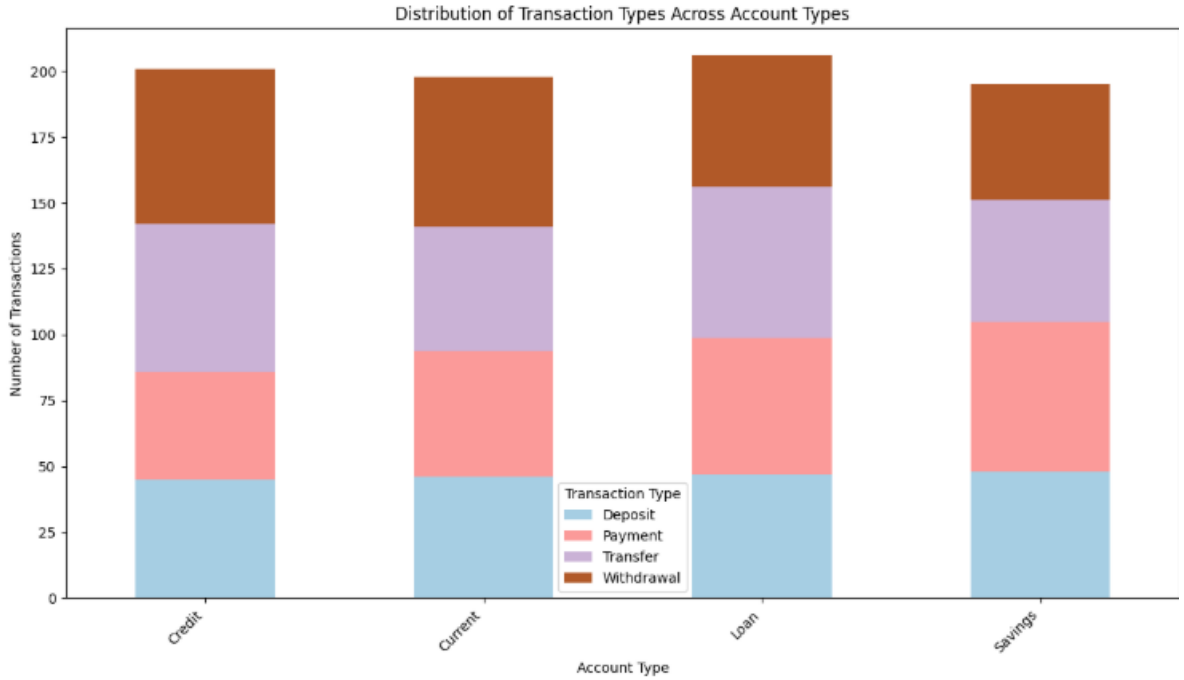
	AccountType	TransactionAmount
0	Credit	51481.438515
1	Current	53914.741703
2	Loan	55384.368856
3	Savings	53969.237943

- This image displays the **Average Transaction Amount** broken down by **Account Type**, showing that Loan accounts have the highest average transaction value at approximately **55,384**, while Credit, Current, and Savings accounts all maintain similar averages around **51,000 to 54,000**.

Distribution of Transaction Types by Account Type:

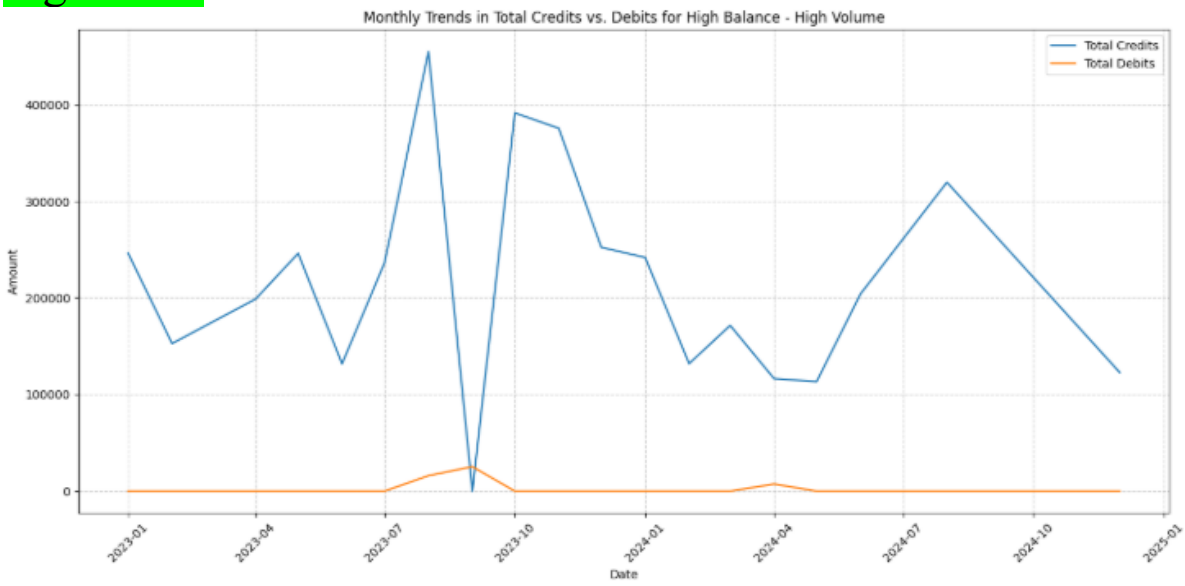
TransactionType	Deposit	Payment	Transfer	Withdrawal
AccountType				
Credit	45	41	56	59
Current	46	48	47	57
Loan	47	52	57	50
Savings	48	57	46	44

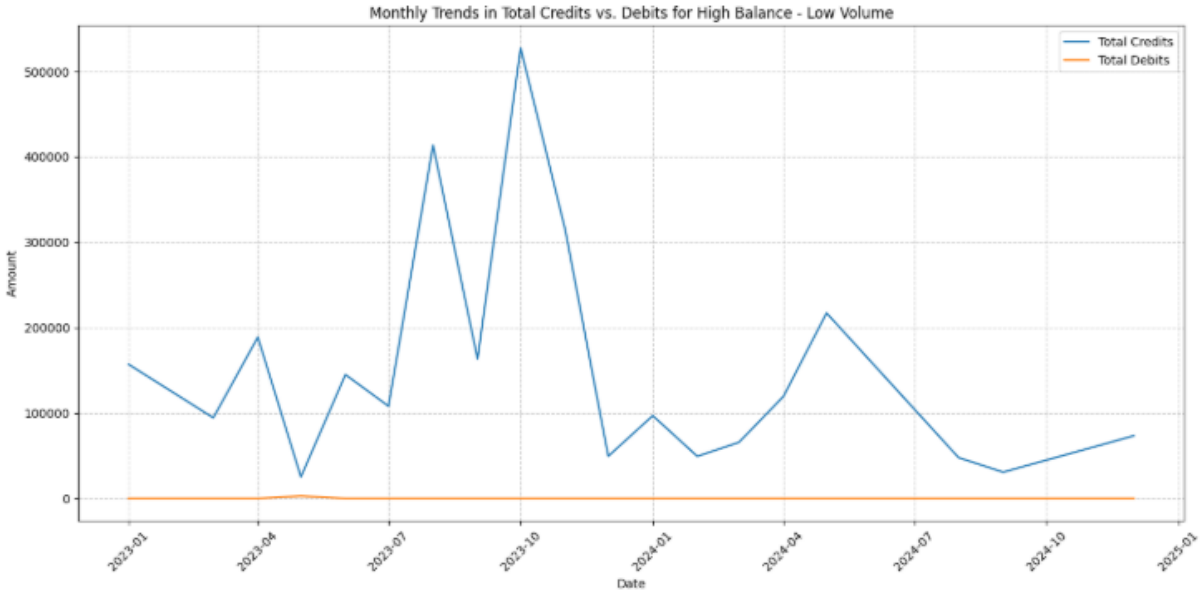
- This image displays the **Distribution of Transaction Types by Account Type**, showing that Credit and Current accounts have the highest frequency of **Withdrawals** (59 and 57 respectively), while Savings accounts are most frequently used for **Payments** (57).

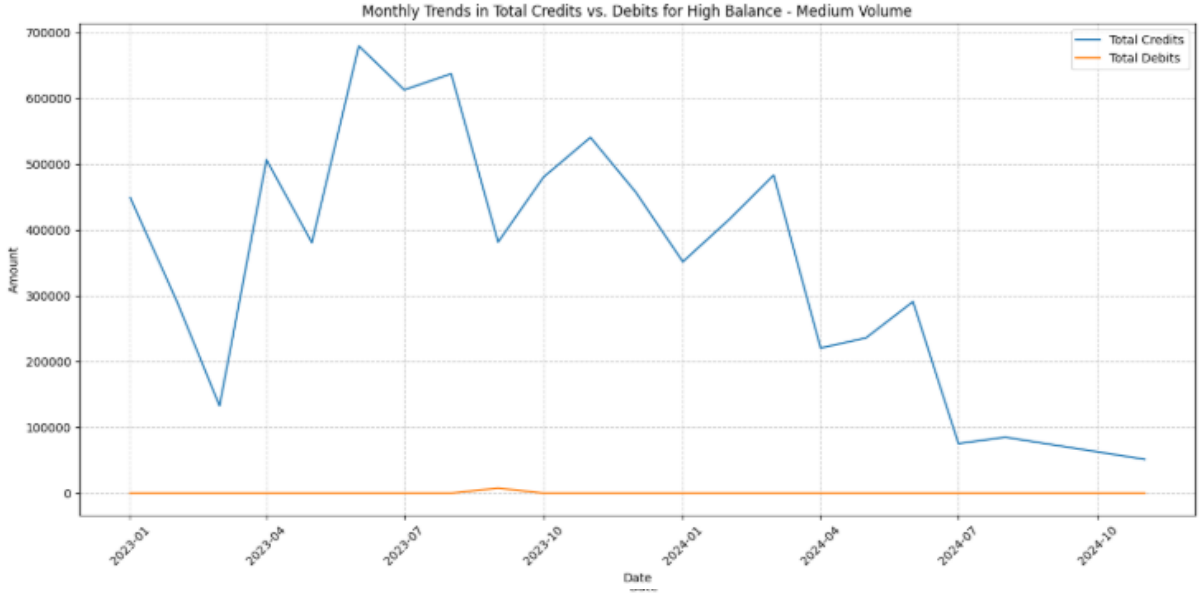


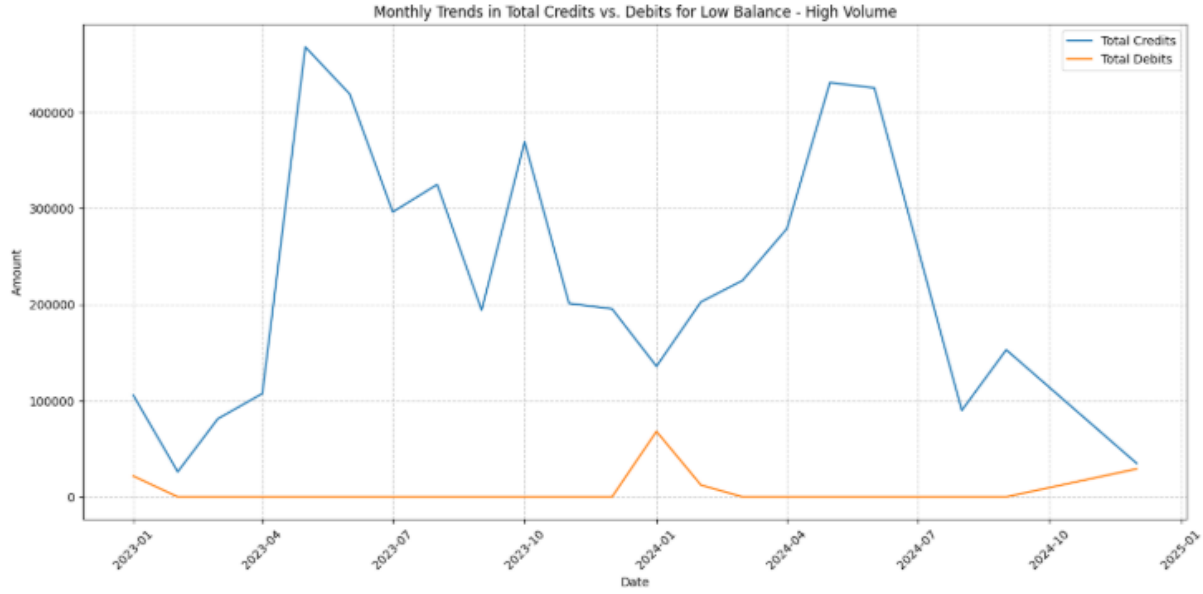
- This stacked bar chart visualizes the volume of different transaction types across four account categories, highlighting that Loan accounts have the highest overall transaction count while Withdrawals are most prominent in Credit and Current accounts.

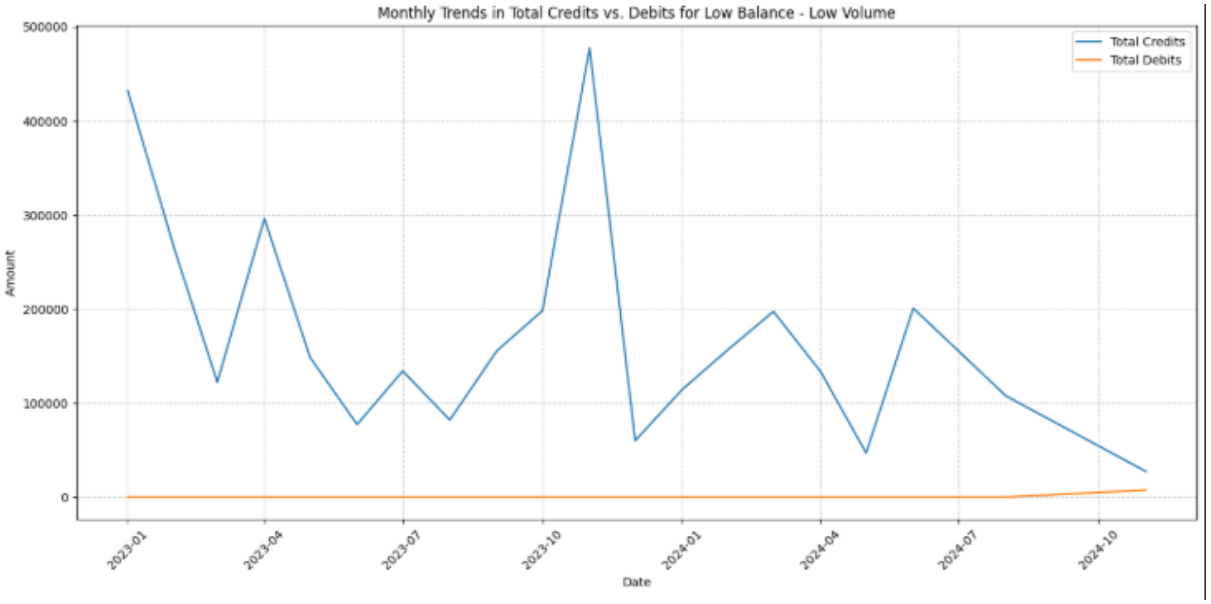
What are the trends in debit vs. credit transactions across segments?

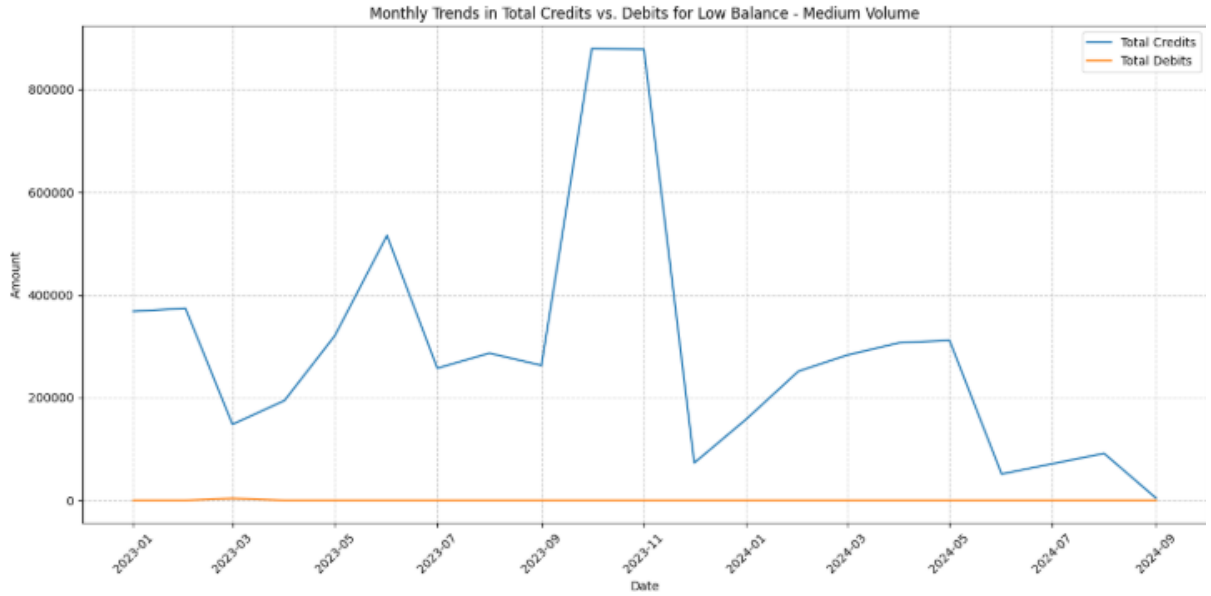


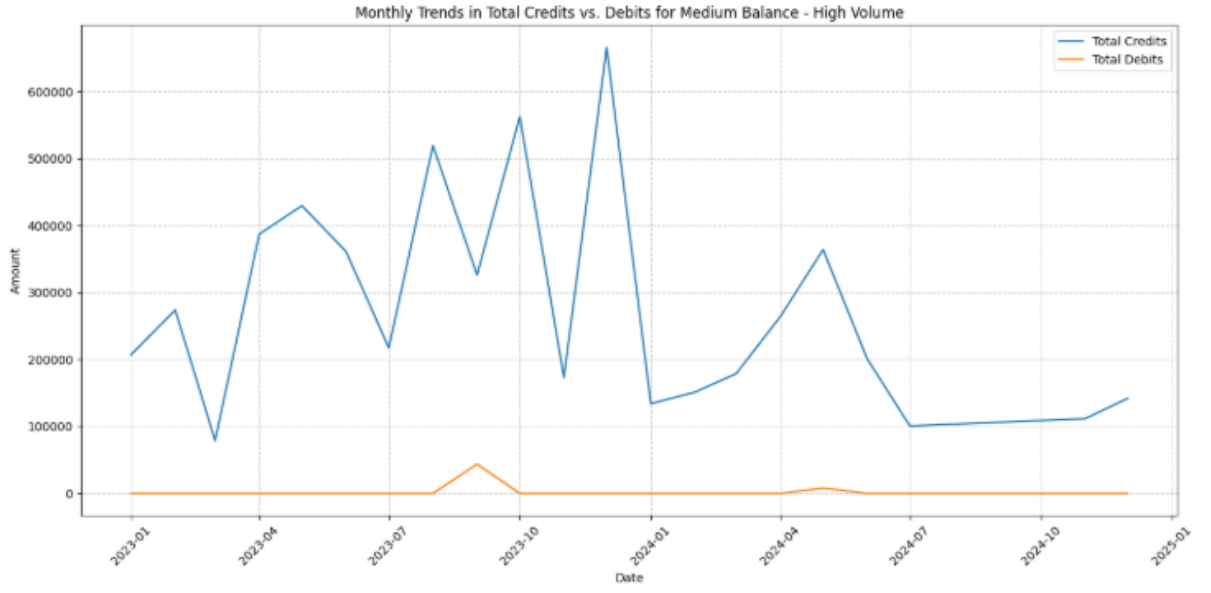

Monthly Trends in Total Credits vs. Debits for High Balance - Low Volume
Total Credits
Total Debits
Amount
Date
0
100000
200000
300000
400000
500000
2023-01
2023-04
2023-07
2023-10
2024-01
2024-04
2024-07
2024-10
2025-01

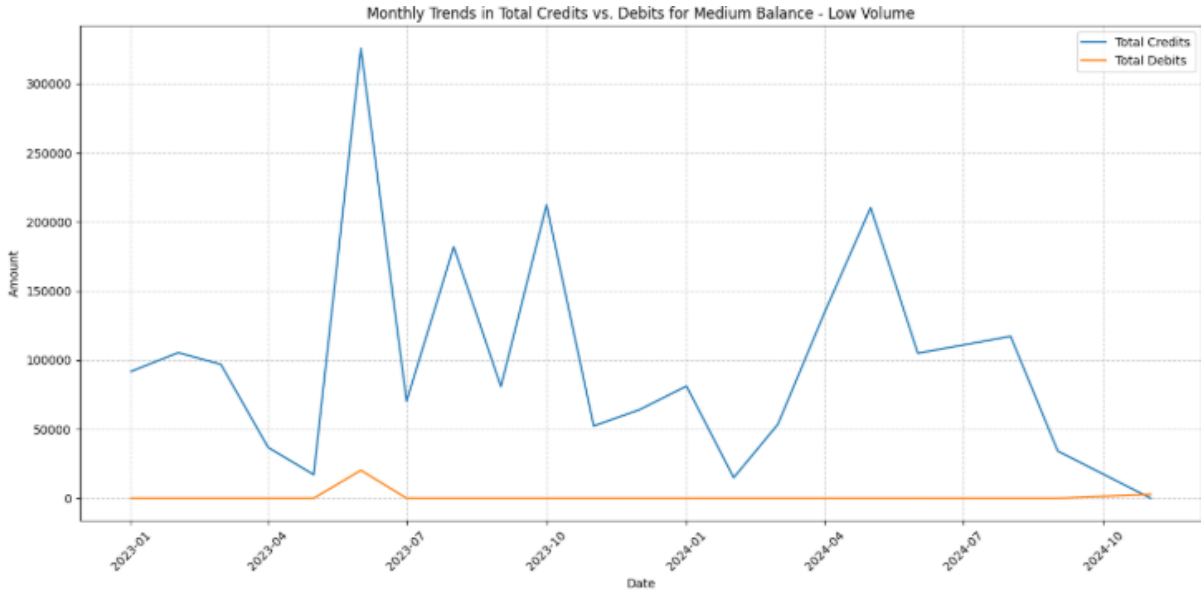

Monthly Trends in Total Credits vs. Debits for High Balance - Medium Volume
Total Credits
Total Debits
Amount
Date
0
100000
200000
300000
400000
500000
600000
700000
2023-01
2023-04
2023-07
2023-10
2024-01
2024-04
2024-07
2024-10

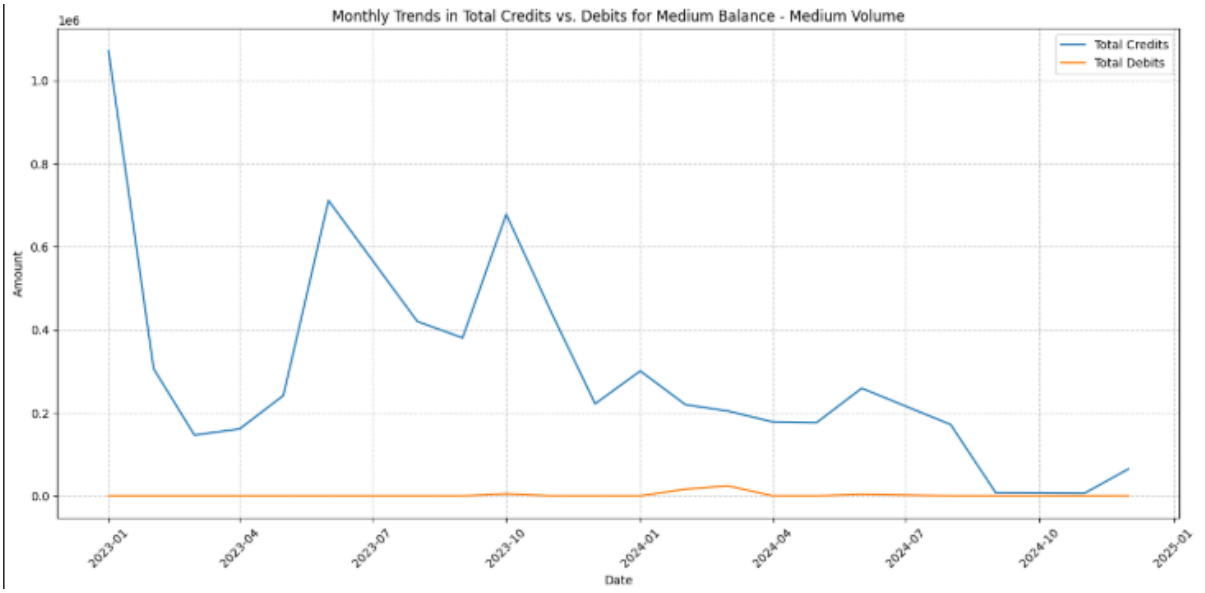

Monthly Trends in Total Credits vs. Debits for Low Balance - High Volume
Total Credits
Total Debits
Amount
Date
0
100000
200000
300000
400000
2023-01
2023-04
2023-07
2023-10
2024-01
2024-04
2024-07
2024-10
2025-01


Monthly Trends in Total Credits vs. Debits for Low Balance - Low Volume
Total Credits
Total Debits
Amount
Date
0
100000
200000
300000
400000
500000
2023-01
2023-04
2023-07
2023-10
2024-01
2024-04
2024-07
2024-10


Monthly Trends in Total Credits vs. Debits for Low Balance - Medium Volume
Total Credits
Total Debits
Amount
Date
0
200000
400000
600000
800000
2023-01
2023-03
2023-05
2023-07
2023-09
2023-11
2024-01
2024-03
2024-05
2024-07
2024-09


Monthly Trends in Total Credits vs. Debits for Medium Balance - High Volume
Total Credits
Total Debits
Amount
Date
0
100000
200000
300000
400000
500000
600000
2023-01
2023-04
2023-07
2023-10
2024-01
2024-04
2024-07
2024-10
2025-01





Can we identify accounts with unusually high risk or inconsistent financial activity?

- **Multifaceted Risk Profiles:** 142 accounts were flagged using a combination of behavioural triggers—most notably the **re-activation of dormant accounts** alongside **high-risk transactions**, which strongly suggests potential fraudulent takeover or illicit use.
- **Volatility as a Critical Signal:** High balance volatility (**BalanceCV** with a Z-score > 2.0) is a primary red flag; when paired with frequent **overdrafts**, it distinguishes between simple cash-flow struggles and deeper financial irregularities.
- **Universal Vulnerability:** Suspicious activity is **segment-agnostic**, appearing across all customer profiles from "High Balance" to "Low Volume" accounts. This proves

that monitoring must be applied universally rather than focusing solely on specific demographics.

1. IQR Anomalies (Balance Volatility):

	AccountID	BalanceStdDev	AverageAccountBalance	BalanceCV
4	ACC11285	70126.826097	62574.613950	112.069131
51	ACC29646	70075.270756	69341.178855	101.058667
78	ACC42467	52980.932871	47684.159638	111.108035
110	ACC55331	73097.164038	54330.176256	134.542475
134	ACC70460	36970.340677	33835.403142	109.265258
139	ACC72197	55398.466619	52246.542930	106.032789
141	ACC74631	50452.054088	44700.284518	112.867412

- The IQR anomalies highlights extreme balance volatility where the standard deviation of the account balance often exceeds the average balance, resulting in high **BalanceCV** values.

2. Z-score Anomalies (Balance Volatility):

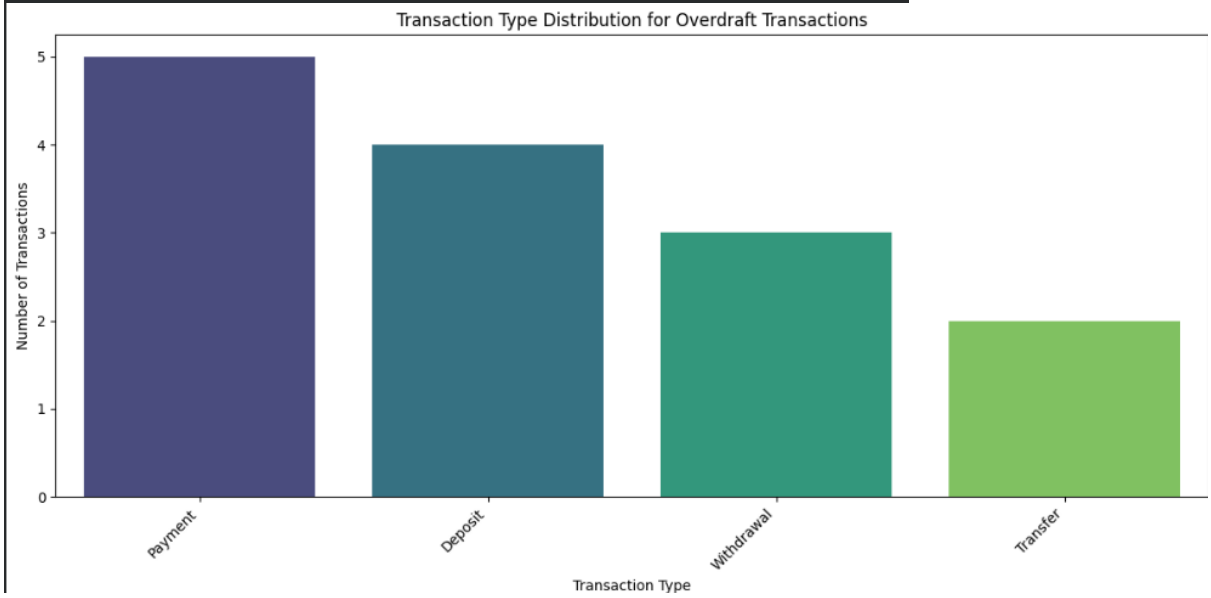
	AccountID	BalanceStdDev	AverageAccountBalance	BalanceCV	ZScore_CV
4	ACC11285	70126.826097	62574.613950	112.069131	2.770653
19	ACC19156	61272.537291	64046.130650	95.669382	2.089539
51	ACC29646	70075.270756	69341.178855	101.058667	2.313366
78	ACC42467	52980.932871	47684.159638	111.108035	2.730736
93	ACC49140	47345.626989	50181.177677	94.349374	2.034716
110	ACC55331	73097.164038	54330.176256	134.542475	3.704015
134	ACC70460	36970.340677	33835.403142	109.265258	2.654202
139	ACC72197	55398.466619	52246.542930	106.032789	2.519951
141	ACC74631	50452.054088	44700.284518	112.867412	2.803807

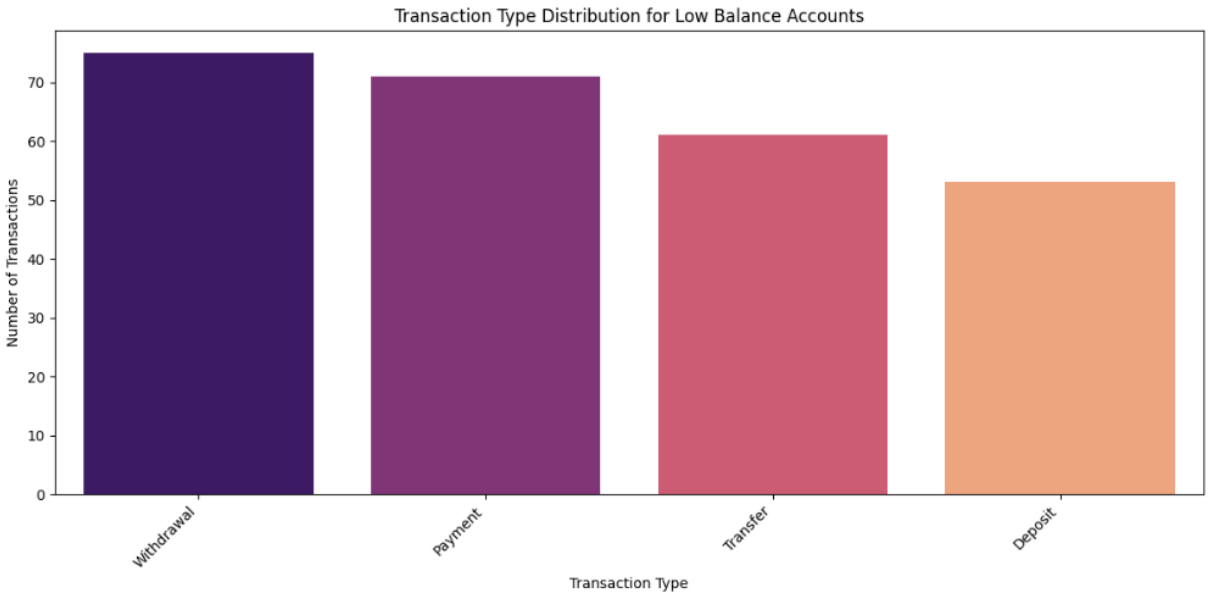
- These tables identify high-risk accounts where the standard deviation of the balance exceeds the average balance, resulting in a **BalanceCV** above 100% and **Z-scores** greater than 2.0, which signifies extreme and statistically significant balance volatility.

What transaction behaviours correlate with lower account balances or overdraft incidents?

Most Frequent Combinations of Anomaly Flags:

	0
LargeWithdrawalCount	52
OverdraftCount	14
IsHighRiskTransaction	190
IsLargeDeposit	46
IsOnDormantAccount	667
IsHighBalanceCVAnomaly	8





- The prominence of 'Payment' as the leading transaction type in overdraft

incidents suggests a direct correlation between spending habits (possibly automated bill payments or frequent card usage) and insufficient funds. This indicates that customers are often overdrawing their accounts not necessarily through cash withdrawals but through their expenditure patterns.

- Accounts with generally 'Low Balance' levels exhibit a wide range of transaction types. While withdrawals are the most frequent, payments, transfers, and deposits are also common. This implies that low balances are maintained despite regular financial activity, rather than due to complete inactivity.
- For overdrafts, 'Payment' and 'Deposit' are surprisingly high, while for low balance accounts, 'Withdrawal' is the highest. This distinction can inform targeted interventions. Overdrafts seem to be driven by committed outflows, whereas low balances might be a result of overall spending patterns including cash access.