

# BANK LOAN ANALYSIS

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## OBJECTIVE:

This project involves an in-depth examination of bank loan data, employing SQL for data querying and manipulation, and subsequently using Power BI, Excel, and Tableau for visualization and advanced analysis. The main objective is to reveal insights concerning loan applications, disbursements, repayments, and borrower demographics. The analysis covers multiple dimensions, including time-based factors (month, term), geographical regions (state), and categorical variables (loan purpose, home ownership status).

## PROBLEM STATEMENT:

### DASHBOARD 1: SUMMARY

- 1. Total Loan Application:** We need to calculate the total number of loan applications received during a specified period. Additionally, it is essential to monitor the Month-to-Date (MTD) loan application and track changes Month-over-Month (MoM).
- 2. Total Funded Amount:** Understanding the total amount of funds disbursed as loans is crucial. We also want to keep an eye on MTD and MoM changes in this metric.
- 3. Total Amount Received:** Tracking the total amount received from borrowers is essential for assessing the bank's cash flow and loan repayment. We should analyse the MTD and MoM changes.
- 4. Average Interest Rate:** Calculating the average interest rate across all loans.
- 5. Average Debt-To-Income Ratio(DTI):** Evaluating the average DTI for our borrowers helps us gauge their financial health.

## 6. Good Loan:

- Good loan application percentage
- Good loan applications
- Good loan funded amount
- Good loan total received amount

## 7. Bad Loan:

- Bad loan application percentage
- Bad loan applications
- Bad loan funded amount
- Bad loan total received amount

8. **Loan Status:** Loan status for total loan application, total funded amount, total received amount, average interest rate, average debt to income ratio.

## **DASHBOARD 2: OVERVIEW**

1. **Monthly Trends by Issue Date (Line Chart):** To identify seasonality and long term trends in lending activities.
2. **Regional Analysis by State (Filled Map):** To identify regions with significant lending activity and assess regional disparities.
3. **Long Term Analysis (Donut Chart):** To allow the client to understand the distribution of loans across various term lengths.
4. **Employee Length Analysis (Bar chart):** How lending metrics are distributed among borrowers with different employment lengths, helping us assess the impact of employment history on loan applications.
5. **Loan Purpose Breakdown (Bar chart):** Will provide a visual breakdown of loan metrics based on the stated purposes of loans, aiding in the understanding of the primary reasons borrowers seek financing.
6. **Home Ownership Analysis (Tree Map):** For a hierarchical view of how home ownership impacts loan applications and disbursements.

## **DASHBOARD 3: DETAILS**

### **GRID**

Need for a comprehensive 'Details Dashboard' that provides a consolidated view of all the essential information within our loan data. This 'Details Dashboard' aims to offer a holistic snapshot of key loan-related metrics and data points, enabling users to access critical information efficiently.

## **SOFTWARE'S USED:**

1. SQL server management studio – 19.0.20209.0
2. Tableau
3. MS Office/Excel

## **DATASET USED:**

The dataset contains the following columns:

1. **id:** Unique ID for each person.a
2. **address\_state:** Address of the person.
3. **application\_type:**
4. **emp\_length:** Number of years a person working in a company
5. **emp\_title:** Job role of a person
6. **grade:**
7. **home\_ownership:** Type of home a person is living.
8. **issue\_date:** Date of loan issued
9. **last\_credit\_pull\_date:**
10. **last\_payment\_date:** Date on which he lastly paid the loan
11. **loan\_status:** Status of the loan
12. **next\_payment\_date:** Date on which a person wants to pay the loan for the next month.
13. **member\_id:**
14. **purpose:** Purpose for which a person applied for loan
15. **sub\_grade:**
16. **term:** For how many months a person has taken loan.
17. **installment:**
18. **int\_rate:** Interest for the loan
19. **loan\_amount:** Total loan amount
20. **total\_acc**

## **DATA ANALYSIS USING SQL:**

## Total Loan Applications

```
SELECT COUNT(id) AS Total_Applications FROM bank_loan_data
```

Total_Applications
38576

## MTD Loan Applications

```
SELECT COUNT(id) AS Total_Applications FROM bank_loan_data  
WHERE MONTH(issue_date) = 12
```

Total_Applications
4314

## PMTD Loan Applications

```
SELECT COUNT(id) AS Total_Applications FROM bank_loan_data  
WHERE MONTH(issue_date) = 11
```

Total_Applications
4035

---

## Total Funded Amount

```
SELECT SUM(loan_amount) AS Total_Funded_Amount FROM bank_loan_data
```

Total_Funded_Amount
435757075

## MTD Total Funded Amount

```
SELECT SUM(loan_amount) AS Total_Funded_Amount FROM bank_loan_data  
WHERE MONTH(issue_date) = 12
```

Total_Funded_Amount
53981425

## PMTD Total Funded Amount

```
SELECT SUM(loan_amount) AS Total_Funded_Amount FROM bank_loan_data  
WHERE MONTH(issue_date) = 11
```

Total_Funded_Amount
47754825

---

## Total Amount Received

```
SELECT SUM(total_payment) AS Total_Amount_Collected FROM bank_loan_data
```

Total_Amount_Collected
473070933

### MTD Total Amount Received

SELECT SUM(total\_payment) AS Total\_Amount\_Collected FROM bank\_loan\_data  
WHERE MONTH(issue\_date) = 12

Total_Amount_Collected
58074380

### PMTD Total Amount Received

SELECT SUM(total\_payment) AS Total\_Amount\_Collected FROM bank\_loan\_data  
WHERE MONTH(issue\_date) = 11

Total_Amount_Collected
50132030

### Average Interest Rate

SELECT AVG(int\_rate)\*100 AS Avg\_Int\_Rate FROM bank\_loan\_data

Avg_Int_Rate
12.0488314172048

### MTD Average Interest

SELECT AVG(int\_rate)\*100 AS MTD\_Avg\_Int\_Rate FROM bank\_loan\_data  
WHERE MONTH(issue\_date) = 12

MTD_Avg_Int_Rate
12.3560408676042

### PMTD Average Interest

SELECT AVG(int\_rate)\*100 AS PMTD\_Avg\_Int\_Rate FROM bank\_loan\_data  
WHERE MONTH(issue\_date) = 11

PMTD_Avg_Int_Rate
11.9417175498261

### Avg DTI

SELECT AVG(dti)\*100 AS Avg\_DTI FROM bank\_loan\_data

Avg_DTI
13.3274331211432

### MTD Avg DTI

SELECT AVG(dti)\*100 AS MTD\_Avg\_DTI FROM bank\_loan\_data

WHERE MONTH(issue\_date) = 12

MTD_Avg_DTI
13.6655377880425

### PMTD Avg DTI

SELECT AVG(dti)\*100 AS PMTD\_Avg\_DTI FROM bank\_loan\_data  
WHERE MONTH(issue\_date) = 11

PMTD_Avg_DTI
13.3027335836364

## GOOD LOAN ISSUED

### Good Loan Percentage

SELECT  
(COUNT(CASE WHEN loan\_status = 'Fully Paid' OR loan\_status = 'Current' THEN id END) \* 100.0) /  
COUNT(id) AS Good\_Loan\_Percentage  
FROM bank\_loan\_data

Good_Loan_Percentage
86.175342181667

### Good Loan Applications

SELECT COUNT(id) AS Good\_Loan\_Applications FROM bank\_loan\_data  
WHERE loan\_status = 'Fully Paid' OR loan\_status = 'Current'

Good_Loan_Applications
33243

### Good Loan Funded Amount

SELECT SUM(loan\_amount) AS Good\_Loan\_Funded\_amount FROM bank\_loan\_data  
WHERE loan\_status = 'Fully Paid' OR loan\_status = 'Current'

Good_Loan_Funded_amount
370224850

### Good Loan Amount Received

SELECT SUM(total\_payment) AS Good\_Loan\_amount\_received FROM bank\_loan\_data  
WHERE loan\_status = 'Fully Paid' OR loan\_status = 'Current'

Good_Loan_amount_received
435786170

## BAD LOAN ISSUED

## Bad Loan Percentage

```
SELECT
    (COUNT(CASE WHEN loan_status = 'Charged Off' THEN id END) * 100.0) /
    COUNT(id) AS Bad_Loan_Percentage
FROM bank_loan_data
```

Bad_Loan_Percentage
13.824657818332

## Bad Loan Applications

```
SELECT COUNT(id) AS Bad_Loan_Applications FROM bank_loan_data
WHERE loan_status = 'Charged Off'
```

Bad_Loan_Applications
5333

## Bad Loan Funded Amount

```
SELECT SUM(loan_amount) AS Bad_Loan_Funded_amount FROM bank_loan_data
WHERE loan_status = 'Charged Off'
```

Bad_Loan_Funded_amount
65532225

## Bad Loan Amount Received

```
SELECT SUM(total_payment) AS Bad_Loan_amount_received FROM bank_loan_data
WHERE loan_status = 'Charged Off'
```

Bad_Loan_amount_received
37284763

## LOAN STATUS

```
SELECT
    loan_status,
    COUNT(id) AS LoanCount,
    SUM(total_payment) AS Total_Amount_Received,
    SUM(loan_amount) AS Total_Funded_Amount,
    AVG(int_rate * 100) AS Interest_Rate,
    AVG(dti * 100) AS DTI
FROM
    bank_loan_data
GROUP BY
    loan_status
```

	loan_status	LoanCount	Total_Amount_Received	Total_Funded_Amount	Interest_Rate	DTI
1	Fully Paid	32145	411586256	351358350	11.6410707918092	13.1673507557434
2	Charged Off	5333	37284763	65532225	13.8785749318289	14.0047328005517
3	Current	1098	24199914	18866500	15.0993260800947	14.7243442736843

```
SELECT
    loan_status,
```

```

SUM(total_payment) AS MTD_Total_Amount_Received,
SUM(loan_amount) AS MTD_Total_Funded_Amount
FROM bank_loan_data
WHERE MONTH(issue_date) = 12
GROUP BY loan_status

```

loan_status	MTD_Total_Amount_Received	MTD_Total_Funded_Amount
Fully Paid	47815851	41302025
Charged Off	5324211	8732775
Current	4934318	3946625

## BANK LOAN REPORT | OVERVIEW

### MONTH

```

SELECT
    MONTH(issue_date) AS Month_Munber,
    DATENAME(MONTH, issue_date) AS Month_name,
    COUNT(id) AS Total_Loan_Applications,
    SUM(loan_amount) AS Total_Funded_Amount,
    SUM(total_payment) AS Total_Amount_Received
FROM bank_loan_data
GROUP BY MONTH(issue_date), DATENAME(MONTH, issue_date)
ORDER BY MONTH(issue_date)

```

	Month_Munber	Month_name	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
1	1	January	2332	25031650	27578836
2	2	February	2279	24647825	27717745
3	3	March	2627	28875700	32264400
4	4	April	2755	29800800	32495533
5	5	May	2911	31738350	33750523
6	6	June	3184	34161475	36164533
7	7	July	3366	35813900	38827220
8	8	August	3441	38149600	42682218
9	9	September	3536	40907725	43983948
10	10	October	3796	44893800	49399567
11	11	November	4035	47754825	50132030
12	12	December	4314	53981425	58074380

### STATE

```

SELECT
    address_state AS State,
    COUNT(id) AS Total_Loan_Applications,
    SUM(loan_amount) AS Total_Funded_Amount,
    SUM(total_payment) AS Total_Amount_Received
FROM bank_loan_data
GROUP BY address_state
ORDER BY address_state

```



	State	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
1	AK	78	1031800	1108570
2	AL	432	4949225	5492272
3	AR	236	2529700	2777875
4	AZ	833	9206000	10041986
5	CA	6894	78484125	83901234
6	CO	770	8976000	9845810
7	CT	730	8435575	9357612
8	DC	214	2652350	2921854
9	DE	110	1138100	1269136
10	FL	2773	30046125	31601905
11	GA	1355	15480325	16728040
12	HI	170	1850525	2080184
13	IA	5	56450	64482
14	ID	6	59750	65329
15	IL	1486	17124225	18875941
16	IN	9	86225	85521
17	KS	260	2872325	3247394
18	KY	320	3504100	3792530
19	LA	426	4498900	5001160
20	MA	1310	15051000	16676279
21	MD	1027	11911400	12985170
22	ME	3	9200	10808
23	MI	685	7829900	8543660
24	MN	592	6302600	6750746
25	MO	660	7151175	7692732
26	MS	19	139125	149342
27	MT	79	829525	892047
28	NC	759	8787575	9534813
29	NE	5	31700	24542
30	NH	161	1917900	2101386
31	NJ	1822	21657475	23425159
32	NM	183	1916775	2084485
33	NV	482	5307375	5451443
34	NY	3701	42077050	46108181
35	OH	1188	12991375	14330148
36	OK	293	3365725	3712649
37	OR	436	4720150	4966903
38	PA	1482	15826525	17462908
39	RI	196	1883025	2001774

## TERM

SELECT

term AS Term,  
COUNT(id) AS Total\_Loan\_Applications,  
SUM(loan\_amount) AS Total\_Funded\_Amount,  
SUM(total\_payment) AS Total\_Amount\_Received

FROM bank\_loan\_data

GROUP BY term

ORDER BY term

	Term	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
1	36 months	28237	273041225	294709458
2	60 months	10339	162715850	178361475

## EMPLOYEE LENGTH

SELECT

emp\_length AS Employee\_Length,  
COUNT(id) AS Total\_Loan\_Applications,  
SUM(loan\_amount) AS Total\_Funded\_Amount,  
SUM(total\_payment) AS Total\_Amount\_Received

FROM bank\_loan\_data

GROUP BY emp\_length

ORDER BY emp\_length

Employee_Length	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
< 1 year	4575	44210625	47545011
1 year	3229	32883125	35498348
10+ years	8870	116115950	125871616
2 years	4382	44967975	49206961
3 years	4088	43937850	47551832
4 years	3428	37600375	40964850
5 years	3273	36973625	40397571
6 years	2228	25612650	27908658
7 years	1772	20811725	22584136
8 years	1476	17558950	19025777
9 years	1255	15084225	16516173

## PURPOSE

SELECT

purpose AS PURPOSE,  
COUNT(id) AS Total\_Loan\_Applications,  
SUM(loan\_amount) AS Total\_Funded\_Amount,  
SUM(total\_payment) AS Total\_Amount\_Received

FROM bank\_loan\_data

GROUP BY purpose

ORDER BY purpose

PURPOSE	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
car	1497	10223575	11324914
credit card	4998	58885175	65214084
Debt consolidation	18214	232459675	253801871
educational	315	2161650	2248380
home improvement	2876	33350775	36380930
house	366	4824925	5185538
major purchase	2110	17251600	18676927
medical	667	5533225	5851372
moving	559	3748125	3999899
other	3824	31155750	33289676
renewable_energy	94	845750	898931
small business	1776	24123100	23814817
vacation	352	1967950	2116738
wedding	928	9225800	10266856

## HOME OWNERSHIP

SELECT

home\_ownership AS Home\_Ownership,  
COUNT(id) AS Total\_Loan\_Applications,  
SUM(loan\_amount) AS Total\_Funded\_Amount,  
SUM(total\_payment) AS Total\_Amount\_Received

FROM bank\_loan\_data

GROUP BY home\_ownership

ORDER BY home\_ownership

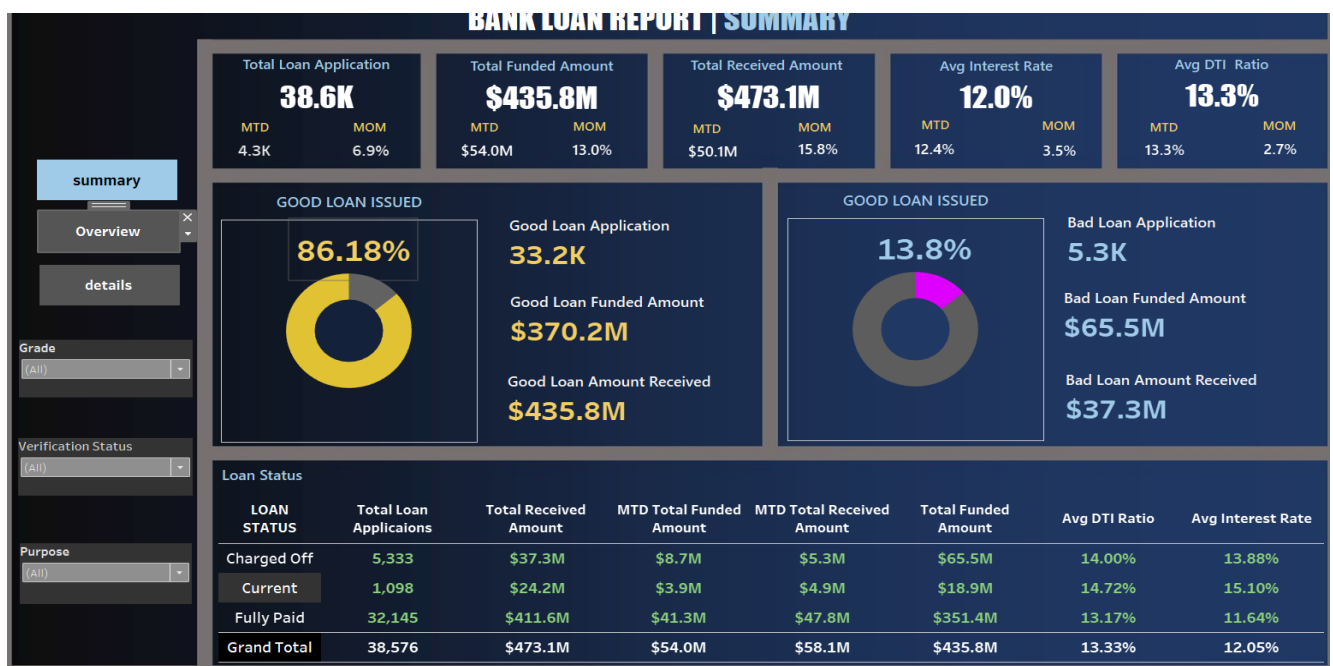
Home_Ownership	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
MORTGAGE	17198	219329150	238474438
NONE	3	16800	19053
OTHER	98	1044975	1025257
OWN	2838	29597675	31729129
RENT	18439	185768475	201823056

## DATA VISUALIZATION USING TABLEAU:

### INTERACTIVE DASHBOARD :

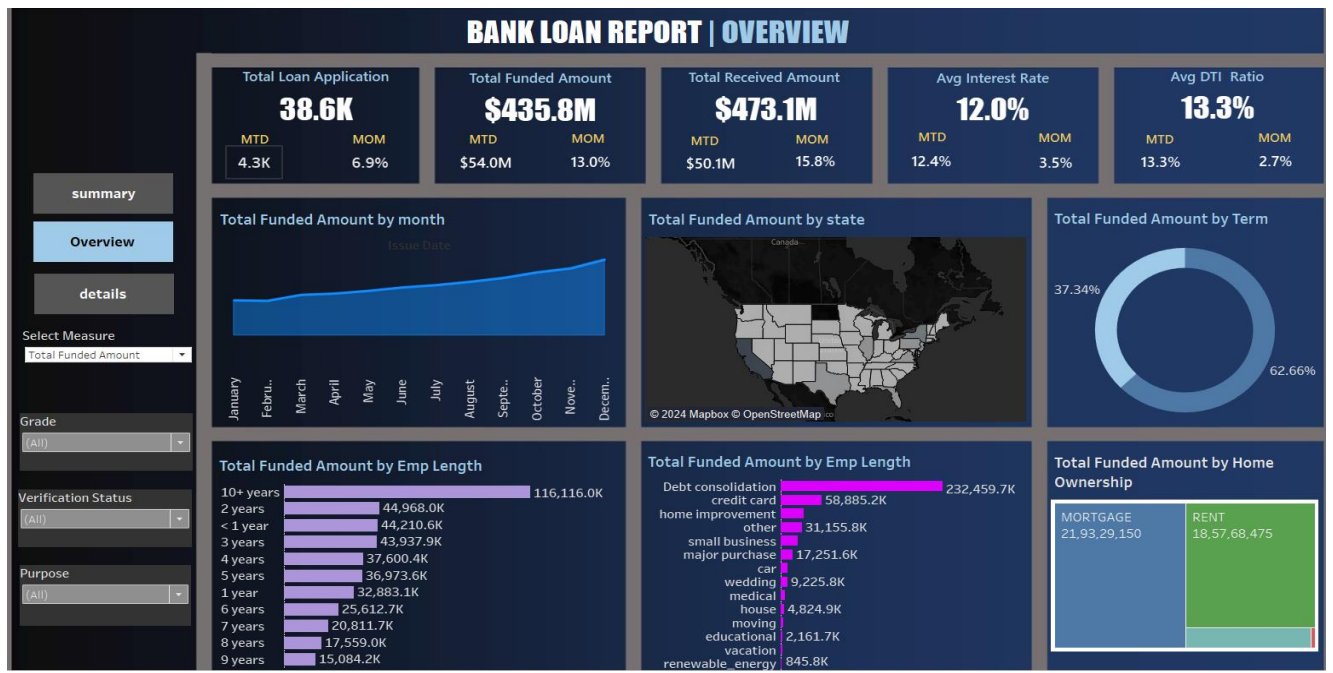
## DASHBOARD 1:

- Delivers essential loan-related metrics and KPIs to oversee lending activities.
- Differentiates between high-risk and low-risk loans for effective risk evaluation.
- Provides insights into loan performance and borrower behavior
- Monitors the total number of loan applications, the amount funded, and the amount repaid.
- Determines the average interest rate and debt-to-income ratio (DTI).
- Assesses the percentage of successful loan applications versus those that are considered as a high risk.



## DASHBOARD 2:

- Presents loan-related information and trends through various visualizations.
- Includes charts on monthly trends, regional analysis, loan terms, employee length, loan purposes, and home ownership.
- Aids in comprehensive analysis and strategic decision-making.
- Visualizes changes in loan applications, funded amount, and amount received over time.
- Identifies regional variations in loan activity.
- Illustrates loan distribution based on term lengths, employment length, loan purposes, and home ownership.



### DASHBOARD 3:

- Offers a comprehensive view of loan portfolio details and borrower profiles.
- Includes metrics on loan performance, borrower characteristics, and loan status.
- Facilitates informed decision-making and risk assessment.
- Summarizes total loan applications, funded amount, and amount received.
- Presents demographic information and borrower characteristics.
- Tracks loan profitability, borrower financial health, and repayment behavior.
- Provides a detailed report categorizing loans by status for easy tracking and analysis.

summary

Overview

details

Select Measure

Total Funded Amount

Grade

(All)

Verification Status

(All)

Purpose

(All)

Total Loan Application

38.6K

MTD

4.3K

MOM

6.9%

Total Funded Amount

\$435.8M

MTD

\$54.0M

MOM

13.0%

Total Received Amount

\$473.1M

MTD

\$50.1M

MOM

15.8%

Avg Interest Rate

12.0%

MTD

12.4%

MOM

3.5%

Avg DTI Ratio

13.3%

MTD

13.3%

MOM

2.7%

Total Funded Amount by deatails

Id	Purpose	Home O..	Sub Grade	Grade	Issue Date	Installment	Int Rate	Loan Amount	Total Payment
98276	educational	RENT	A3	A	07-07-2021	168.6	0	5,400	6.0
98339	vacation	RENT	A5	A	07-07-2021	160.7	0	5,100	5.7
98982	credit card	RENT	B2	B	07-07-2021	159.0	0	5,000	5.7
101579	small business	RENT	C1	C	07-07-2021	324.0	0	10,000	11.6
102376	small business	RENT	C2	C	07-07-2021	813.7	0	25,000	29.2
106079	educational	RENT	B5	B	07-07-2021	112.9	0	3,500	3.9
106360	Debt consolidation	RENT	F4	F	07-07-2021	84.9	0	2,700	3.4
107136	small business	RENT	C2	C	07-07-2021	398.7	0	12,250	13.1
109355	credit card	RENT	C5	C	07-07-2021	39.6	0	1,200	1.4
111917	moving	RENT	B4	B	07-08-2021	205.4	0	6,400	7.3
112216	Debt consolidation	RENT	D1	D	07-08-2021	397.8	0	12,000	14.3
112245	car	RENT	A2	A	07-07-2021	155.4	0	5,000	5.5
112323	moving	RENT	C1	C	07-07-2021	113.4	0	3,500	4.0
113156	credit card	RENT	A4	A	07-08-2021	109.8	0	3,500	3.9
113194	other	RENT	B5	B	07-08-2021	112.9	0	3,500	4.0
116582	Debt consolidation	RENT	E2	E	07-08-2021	340.6	0	10,000	12.2
117863	Debt consolidation	RENT	B5	B	07-08-2021	258.0	0	8,000	9.2
120215	educational	RENT	A2	A	07-08-2021	124.3	0	4,000	4.4
120374	credit card	RENT	B1	B	07-08-2021	63.3	0	2,000	2.2
120525	car	RENT	C3	C	07-08-2021	130.8	0	4,000	4.7
122404	credit card	RENT	F2	F	07-08-2021	444.0	0	12,750	13.8
122718	credit card	RENT	F2	F	07-08-2021	644.3	0	18,500	20.0
123228	small business	RENT	B4	B	07-09-2021	642.0	0	20,000	12.8
124436	Debt consolidation	RENT	C4	C	07-09-2021	157.7	0	4,800	5.6

Based on the analysis of bank loan data, the following key insights have been identified: