Detailed analysis of Bank Loan Data using MS SQL Server, POWER BI dashboard and Excel.



# BANK LOAN ANALYSIS

### FUNCTIONALITIES USED

#### **SQL - MS SQL SERVER**

```
Creating Database
  Creating Table
<sup>∨</sup> Select
  Datename
  Datepart
Cast
  Decimal
  Month
  Hour
√ Quarter
  Day
  Group by
  Order by
  Decimal
√
Limit
  Count

√ Distinct

  CTE
```

**Partition** 

#### **POWER BI**

```
Connecting to SQL Server
 V Data Cleaning
V Data Modelling
 Data Processing
  v
V
Power Query
 Date Tables
Time Intelligence Func
 √ DAX
 Date Function
 √ Text Function
 Filter Function
Calculate
 SUM/SUMX
Creating KPI's
New Card Visual
Creating Charts
Formatting visuals
Creating Functions
Navigations
```

### SOFTWARE USED

- -MS OFFICE/ EXCEL
- -MS SQL SERVER
- -SQL SERVER MANAGEMENT STUDIO
- -POWER BI

#### **DASHBOARD 1: SUMMARY**

**Key Performance Indicators (KPIs) Requirements:** 

1.Total Loan Applications: We need to calculate the total number of loan applications received during a specified period. Additionally, it is essential to monitor the Monthto-Date (MTD) Loan Applications 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 the MTD Total Funded Amount and analyse the Month-over-Month (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 Month-to-Date (MTD) Total Amount Received and observe the Month-over- Month (MoM) changes. 4.Average Interest Rate: Calculating the average interest rate across all loans, MTD, and monitoring the Month-over-Month (MoM) variations in interest rates will provide insights into our lending portfolio's overall cost. 5.Average Debt-to-Income Ratio (DTI): Evaluating the average DTI for our borrowers helps us gauge their financial health. We need to compute the average DTI for all loans, MTD, and track Monthover-Month (MoM) fluctuations.

#### **DASHBOARD 1: SUMMARY**

### Good Loan v Bad Loan KPI's Good Loan:

- **1.Good Loan Application Percentage**
- **2.Good Loan Applications**
- **3.Good Loan Funded Amount**
- **4.Good Loan Total Received Amount**

#### **Bad Loan:**

- **1.Bad Loan Application Percentage**
- 2.Bad Loan Applications
- 3.Bad Loan Funded Amount
- **4.Bad Loan Total Received Amount**

#### **Loan Status Grid View**

In order to gain a comprehensive overview of our lending operations and monitor the performance of loans, we aim to create a grid view report categorized by 'Loan Status.' By providing insights into metrics such as 'Total Loan Applications,' 'Total Funded Amount,' 'Total Amount Received,' 'Month-to-Date (MTD) Funded Amount,' 'MTD Amount Received,' 'Average Interest Rate,' and 'Average Debt-to-Income Ratio (DTI),' this grid view will empower us to make data-driven decisions and assess the health of our loan portfolio.

#### **CHARTS**

I1.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.Loan 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.

#### Objective:

The primary objective of the Details Dashboard is to provide a comprehensive and user-friendly interface for accessing vital loan data. It will serve as a onestop solution for users seeking detailed insights into our loan portfolio, borrower profiles, and loan performance.

### A. BANK LOAN REPORT | SUMMARY KPI's:

```
-- Total Loan Applications
   SELECT COUNT(id) AS Total Loan Applications FROM bank loan data
   Eselect count(id) as MTD_Total_Loan_Applications FROM bank_loan_data
    where month(issue date)=12
   iselect count(id) as PMTD_Total_Loan_Applications FROM bank_loan_data
    where month(issue date)=11
100 %
Total Loan Applications
     38576
    MTD_Total_Loan_Applications
    4314
    PMTD_Total_Loan_Applications
```

```
-- Total Funded Amount

☐ select sum(loan amount) as Total Funded Amount from Bank Loan Data
iselect sum(loan_amount) as MTD_Total_Funded_Amount from bank_loan_data
  where month(issue_date)=12
iselect sum(loan_amount) as PMTD_Total_Funded_Amount from bank_loan_data
 where month(issue date)=11
0/0
Results Messages
 Total Funded Amount
  435757075
 MTD_Total_Funded_Amount
  53981425
 PMTD_Total_Funded_Amount
  47754825
```

```
-- Total Amount Received
   □select sum(total_payment) as Total_Amount_Received from Bank_Loan_Data
   == select sum(total_payment) as MTD_Total_Amount_Received from bank_loan_data
     where month(issue_date)=12
   == select sum(total_payment) as PMTD_Total_Amount_Received from bank_loan_data
     where month(issue date)=11
100 %
■ Results ■ Messages
    Total Amount Received
     473070933
     MTD_Total_Amount_Received
     58074380
     PMTD_Total_Amount_Received
     50132030
```

```
-- Average Interest Rates

☐select avg(int_rate)*100 as Average_Interest_Rates from Bank_Loan_Data
iselect avg(int_rate)*100 as MTD_Average_Interest_Rates from Bank_Loan_Data
  where month(issue date)=12
select avg(int_rate)*100 as PMTD_Average_Interest_Rates from Bank_Loan_Data
  where month(issue_date)=11
9/0
Results Messages
 Average_Interest_Rates
  12.0488314172048
  MTD Average Interest Rates
  12.3560408676042
  PMTD_Average_Interest_Rates
  11.9417175498261
```

```
-- Average DTI

■ select avg(dti)*100 as Average DTI from Bank Loan Data
  where month(issue_date)=12
  =|select avg(dti)*100 as PMTD_Average_DTI from Bank_Loan_Data
    where month(issue date)=11
100 %
Average_DTI
    13.3274331211432
    MTD_Average_DTI
    13.6655377880425
   PMTD_Average_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 Applications
    SELECT COUNT(id) AS Good Loan Applications FROM bank loan data
    WHERE loan_status = 'Fully Paid' OR loan_status = 'Current'
    -- 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 Amount Received
   SELECT SUM(total payment) AS Good Loan amount received FROM bank loan data
    WHERE loan_status = 'Fully Paid' OR loan_status = 'Current'
100 % -
Good Loan Percentage
    86.175342181667
    Good_Loan_Applications
    33243
    Good_Loan_Funded_amount
    370224850
    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 Applications
     SELECT COUNT(id) AS Bad Loan Applications FROM bank loan data
    WHERE loan status = 'Charged Off'
    -- Bad Loan Funded Amount
    SELECT SUM(loan amount) AS Bad Loan Funded amount FROM bank loan data
    WHERE loan status = 'Charged Off'
     -- Bad Loan Amount Received
     SELECT SUM(total_payment) AS Bad_Loan_amount_received FROM bank_loan_dat
    WHERE loan status = 'Charged Off'
100 %
Bad Loan Percentage
     13.824657818332
    Bad Loan Applications
     5333
    Bad_Loan_Funded_amount
     65532225
    Bad Loan amount received
     37284763
```

#### **LOAN STATUS**

Current

4934318

```
--LOAN STATUS
  -
        SELECT
             loan status,
             COUNT(id) AS Total Loan Applications,
             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
        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
0 %
Results 🗐 Messages
   loan_status
              Total_Loan_Applications
                                  Total_Amount_Received
                                                     Total_Funded_Amount
                                                                        Interest_Rate
                                                                                        DTI
    Fully Paid
              32145
                                  411586256
                                                      351358350
                                                                        11.6410707918092
                                                                                        13.1673507557434
                                                                        13.8785749318289 14.0047328005517
    Charged Off
              5333
                                  37284763
                                                      65532225
    Current
              1098
                                  24199914
                                                      18866500
                                                                        15.0993260800947 14.7243442736843
   loan_status
              MTD_Total_Amount_Received
                                      MTD_Total_Funded_Amount
    Fully Paid
              47815851
                                      41302025
    Charged Off
              5324211
                                      8732775
```

3946625

#### A. BANK LOAN REPORT | OVERVIEW

```
--MONTH
   FISELECT
          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)
100 %

    ■ Results
          Messages
     Month Munber
                               Total Loan Applications
                                                    Total Funded Amount
                   Month name
                                                                       Total Amount Received
    1
                   January
                                2332
                                                    25031650
                                                                       27578836
1
     2
                   February
                                2279
                                                    24647825
                                                                       27717745
     3
                   March
                                2627
                                                    28875700
                                                                       32264400
     4
                                2755
                                                    29800800
                                                                       32495533
                   April
                                2911
     5
                   May
                                                    31738350
                                                                       33750523
5
     6
                                3184
                                                                       36164533
                   June
                                                    34161475
     7
                   July
                                3366
                                                    35813900
                                                                       38827220
                   August
     8
                                3441
                                                    38149600
                                                                       42682218
8
     9
                                3536
                   September
                                                    40907725
                                                                       43983948
                   October
     10
                                3796
                                                    44893800
                                                                       49399567
10
                   November
                                4035
                                                    47754825
     11
                                                                       50132030
11
     12
                   December
                                4314
                                                    53981425
                                                                       58074380
12
```

```
□--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
100 %
           Messages

    ■ Results
          Total Loan Applications
                                Total Funded Amount
                                                   Total Amount Received
     State
1
     AK
            78
                                1031800
                                                    1108570
2
     AL
           432
                                4949225
                                                    5492272
3
     AR
            236
                                2529700
                                                    2777875
           833
4
     AZ
                                                    10041986
                                9206000
           6894
     CA
                                                    83901234
5
                                78484125
            770
6
     CO
                                8976000
                                                    9845810
7
     CT
            730
                                8435575
                                                    9357612
     DC
            214
                                2652350
                                                    2921854
8
9
     DE
           110
                                1138100
                                                    1269136
     FL
10
            2773
                                30046125
                                                    31601905
            1355
11
     GA
                                15480325
                                                    16728040
12
     HI
            170
                                1850525
                                                    2080184
            5
                                56450
                                                    64482
13
     IA
     ID
           6
                                59750
                                                    65329
14
           1486
                                17124225
     IL
                                                    18875941
15
           9
                                                    85521
16
     IN
                                86225
17
      KS
            260
                                 2872325
                                                    3247394
      KY
            320
                                 3504100
18
                                                    3792530
```

```
--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
100 %
Total Loan Applications
                                Total Funded Amount
                                                 Total Amount Received
     Term
     36 months 28237
                                273041225
                                                 294709458
1
2
     60 months 10339
                                162715850
                                                 178361475
```

	Employee_Length	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
1	9 years	1255	15084225	16516173
2	8 years	1476	17558950	19025777
3	7 years	1772	20811725	22584136
4	6 years	2228	25612650	27908658
5	1 year	3229	32883125	35498348
6	5 years	3273	36973625	40397571
7	4 years	3428	37600375	40964850
8	3 years	4088	43937850	47551832
9	2 years	4382	44967975	49206961
10	< 1 year	4575	44210625	47545011
11	10+ years	8870	116115950	125871616

```
-- 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 COUNT(id) desc
100 % -
```

⊞ Resul	ts 📲	Messages
BOOK BOOK STATE		

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

```
-- 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 COUNT(id) desc
100 % -
```

⊞ Resul	ts 📲	Messages
BOOK BOOK STATE		

PURPOSE	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
Debt consolidation	182 <b>1</b> 4	232459675	253801871
credit card	4998	58885175	65214084
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	Debt consolidation credit card other home improvement major purchase small business car wedding medical moving house vacation educational	Debt consolidation         18214           credit card         4998           other         3824           home improvement         2876           major purchase         2110           small business         1776           car         1497           wedding         928           medical         667           moving         559           house         366           vacation         352           educational         315	Debt consolidation       18214       232459675         credit card       4998       58885175         other       3824       31155750         home improvement       2876       33350775         major purchase       2110       17251600         small business       1776       24123100         car       1497       10223575         wedding       928       9225800         medical       667       5533225         moving       559       3748125         house       366       4824925         vacation       352       1967950         educational       315       2161650

```
--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 COUNT(id) desc
```

100	% •			
<b>III</b>	Results 📶 Messa	ges		
	Home_Ownership	Total_Loan_Applications	Total_Funded_Amount	Total_Amount_Received
1	RENT	18439	185768475	201823056
2	MORTGAGE	17198	219329150	238474438
3	OWN	2838	29597675	31729129
4	OTHER	98	1044975	1025257
5	NONE	3	16800	19053

### POWER BI DASHBOARD

#### BANK LOAN REPORT | SUMMARY



Summary

Overview

**Details** 

State

All

Grade

All

**Purpose** 

All

**Total Funded Amount Total Loan Applications** 

38.6K

4.3K

\$435.8M MoM \$54.0M 13.04% **Total Amount Received** MoM \$58.1M

15.8% \$0.1

**Avg Interest Rate** 12.05% MoM 3.5%

13.7% 2.73%

Avg DTI

**GOOD LOAN ISSUED Good Loan Applications** 33K Good Loan Funded Amount 86.18% \$370.2M

Good Loan Received Amount \$435.8M



#### **LOAN STATUS**

Loan Status	Total Loan Applications	Total Funded Amount  ▼	Total Amount Received	MTD Total Funded Amount	MTD Total Amount Received	Avg Interest Rate	Avg DTI
Fully Paid	32145.0	\$35,13,58,350.0	\$41,15,86,256.0	\$4,13,02,025	\$4,78,15,851	11.64%	13.17%
Charged Off	5333.0	\$6,55,32,225.0	\$3,72,84,763.0	\$87,32,775	\$53,24,211	13.88%	14.00%
Current	1098.0	\$1,88,66,500.0	\$2,41,99,914.0	\$39,46,625	\$49,34,318	15.10%	14.72%
Total	38576.0	\$43,57,57,075.0	\$47,30,70,933.0	\$5,39,81,425	\$5,80,74,380	12.05%	13.33%

#### **BANK LOAN REPORT | OVERVIEW**



**Summary** 

Overview

Details

Select Measure

Total Loan Applications ✓

State



Grade

All V

Good vs Bad Loan

All ~

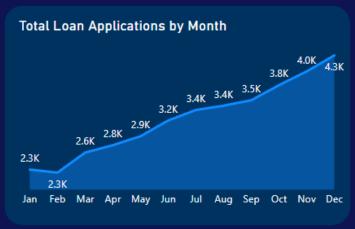


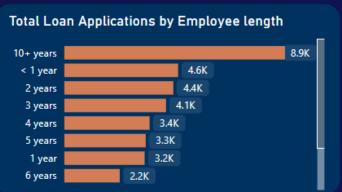




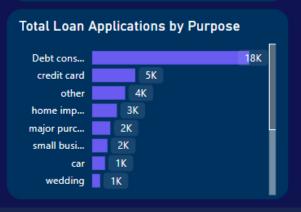




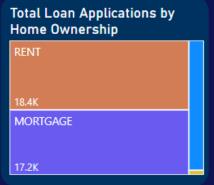












#### **BANK LOAN REPORT | OVERVIEW**

IGI

**Total Loan Applications** 

38.6K

4.3K

6.9%

**Total Funded Amount** 

\$435.8M

MTD \$54.0M MoM 13.04% Total Amount Received

\$473.11

\$58.1M

МоМ

15.8%

Avg Interest Rate

MoM

3.5%

MTD \$0.1 13.33<sup>1</sup>

13.7%

2.73%

Avg DTI

Summary

Overview

Details

State

All ~

Grade

All V

**Good vs Bad Loan** 

All V

ld	Purpose	Home Ownership	Grade	Sub Grade	Issue Date	Funded Amount	Int Rate	Installment	Amount Received
54734	Debt consolidation	RENT	В	B4	09 August 2021	\$25,000.0	0.12	829.10	\$29,330.0
55742	credit card	RENT	В	B5	08 May 2021	\$7,000.0	0.11	228.22	\$8,216.0
57245	Debt consolidation	OWN	С	C2	10 March 2021	\$1,200.0	0.13	40.50	\$1,458.0
57416	Debt consolidation	RENT	С	C3	09 November 2021	\$10,800.0	0.14	366.86	\$13,208.0
58915	Debt consolidation	RENT	В	B3	08 April 2021	\$7,500.0	0.10	162.34	\$5,844.0
59006	credit card	MORTGAGE	С	C5	09 September 2021	\$3,000.0	0.14	102.92	\$3,705.0
61390	credit card	MORTGAGE	Α	A5	10 February 2021	\$4,000.0	80.0	125.13	\$4,452.0
61419	Debt consolidation	RENT	D	D2	10 February 2021	\$5,600.0	0.15	194.02	\$6,475.0
62102	Debt consolidation	RENT	В	B1	10 April 2021	\$3,200.0	0.10	103.08	\$3,414.0
65426	car	MORTGAGE	В	B1	09 August 2021	\$4,000.0	0.11	131.22	\$2,755.0
65640	home improvement	MORTGAGE	С	C2	08 May 2021	\$5,000.0	0.11	87.19	\$3,154.0
66431	Debt consolidation	RENT	В	B5	09 February 2021	\$2,525.0	0.12	84.12	\$3,028.0
66749	Debt consolidation	MORTGAGE	С	C4	08 December 2021	\$10,625.0	0.13	360.43	\$12,975.0
66943	Debt consolidation	RENT	В	B4	10 August 2021	\$2,800.0	0.11	61.57	\$3,144.0
66964	Debt consolidation	MORTGAGE	D	D3	08 June 2021	\$7,500.0	0.13	253.58	\$9,129.0
67503	Debt consolidation	MORTGAGE	Α	A4	09 October 2021	\$10,000.0	0.09	316.11	\$11,280.0
68163	small business	MORTGAGE	Α	A3	10 February 2021	\$3,000.0	0.07	92.82	\$3,342.0
68381	Debt consolidation	RENT	Α	A5	08 March 2021	\$6,625.0	0.09	209.54	\$7,542.0
68817	major purchase	MORTGAGE	С	C1	08 March 2021	\$10,000.0	0.11	327.53	\$11,709.0
68926	moving	RENT	D	D2	08 August 2021	\$2,300.0	0.13	77.69	\$2,797.0
69001	credit card	MORTGAGE	Α	A5	09 September 2021	\$15,000.0	0.09	476.58	\$17,136.0
60124	Dobt consolidation	MODTOACE	R	R/I	08 March 2021	€19 ∩∩∩ ∩	0.10	59/12	¢ว1 กว <u>9</u> ก

### EXCEL DASHBOARD



#### BANK LOAN REPORT | OVERVIEW

III

**SUMMARY** 

**OVERVIEW** 

DETAILS





Total Loan Applications

38.6K

MID MoM
4.3K 6.9%

\$435.8

13.0%

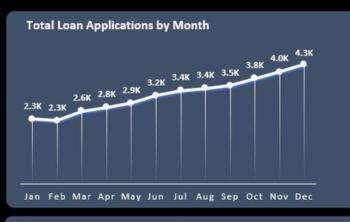
\$54.0

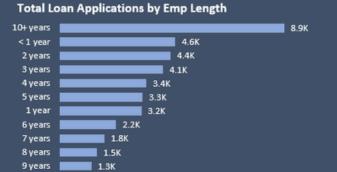
\$473.1

MID Mom
\$58.1 15.8%

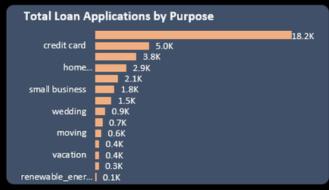
 Avg DTI
13.33%

MTD MoM
13.67 2.7%













## Thank you.