

# **Loan Characteristics**

**By:**

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## **Overview:**

This project aims to model the prepayment risk associated with Mortgage-Backed Securities (MBS). By analysing historical loan data and various financial indicators, we seek to predict the likelihood of loan prepayment and understand the factors influencing this risk.

## **Data Preparation:**

- Dataset containing variables such as CS, MIP, Units, OCLTV, DTI, OrigUPB, LTV, OrigInterestRate, OrigLoanTerm, EverDelinquent, MonthsDelinquent, MonthsInRepayment, IsFirstTime, CreditRange, LTV\_range, and Repay\_range.
- Using Power Bi, I have deleted all duplicated rows, null and missing values.
- Changed data type according to type of data.
- Labelling has been done on columns like CreditScore, LTV, DTI, MonthsInRepayment.

## **Filters:**

### **1. Credit Range Filter:**

**Type:** Range filter or categorical filter

**Description:** Allows users to filter loans based on credit score ranges, enabling them to analyze prepayment and delinquency rates for different credit profiles.

**Values Taken:** Poor(0-650 Credit Score), Fair(650-700), Good(700-750), Excellent(750-900)

### **2. LTV Range Filter:**

**Type:** Range filter or categorical filter

**Description:** Enables users to filter loans based on loan-to-value (LTV) ratio ranges, helping them explore how LTV ratios affect prepayment and delinquency rates.

**Values Taken:** Low(0-25), Medium(25-50) and High(50-1000)

### **3. DTI Range Filter:**

**Type:** Range filter or categorical filter

**Description:** Allows users to filter loans based on debt-to-income (DTI) ratio ranges, facilitating analysis of the impact of DTI ratios on prepayment and delinquency.

**Values Taken:** Low(0-25), Medium(25-50) and High(50-1000)

### **4. Geographic Filter:**

**Type:** Categorical Filter

**Description:** Provide filters for users to analyze prepayment rates based on geographical locations.

### **5. Time Filter:**

**Type:** Categorical Filter

**Description:** Allow users to filter the data based on time periods.

**Values Taken:** Months, quarters, or years.

### **6. Delinquency Status Filter:**

**Type:** Categorical Filter

**Description:** This filter helps in analyzing prepayment rates for loans at different stages of delinquency.

**Values Taken:** Current, Past due, Defaulted.

## **KPIs:**

### **1. Prepayment Risk based on Credit Range using Donut Chart:**

- Users with excellent credit score have prepaid their loans early.
- Users with low DTI ratio and excellent credit score have high prepayment rate.
- Users who have delinquent status as defaulted with fair credit score have not prepay their loans.
- Users with delinquent status as current with excellent credit score have repay their loans.
- As the number of years are passing prepayment rate keep on increasing and credit score most of the time lie between good to poor.
- Users with good and fair credit score have less loan term which means they will try to repay the loan as early as possible.
- The higher the prepayment rate, the more prepayments are expected and the less interest the investor is likely to receive in total. This is called prepayment risk.

### **2. Prepayment Rate based on Delinquency Status using Histogram:**

- Being delinquent refers to the state of being past due on a debt.
- Delinquency occurs as soon as a borrower misses a payment on a loan, which can affect their credit score.
- Delinquency rates are used to show how many accounts in a financial institution's portfolio are delinquent.
- Consistently delinquent borrowers end up in default.
- Borrower with good CIBIL score have no overdue left for loan payment.
- Users with high DTI ratio have defaulted delinquent status which means they have not paid the loan amount for more than 270 days.
- Prepayment rate is indirectly proportional to delinquency which means that people with defaulted delinquency status have not pay their loans on time.

### **3. Original Unpaid Balance and Prepayment Rate based on DTI range along with LTV value using scatter plot:**

- Prepayment rate is high for users having high DTI and low LTV.
- High unpaid balance which is around 131k have been recorded for users having high LTV and DTI ratio.

#### **4. Average Loan Term using Gauge Visual:**

- Loan term is less for excellent credit score user while it is more for poor credit score users.
- Defaulted users have high loan term as they are unable to pay the loan on time.
- Loan term keep on increasing along with number of years.

#### **5. Average Original Interest Rate using Gauge Visual:**

- Interest rates are high for poor credit score users.
- Users with high DTI ratio have to pay more interest then the less one.
- Defaulted users have interest rate of 7.04% while current users have 6.92%.
- Over a period of time loan interest vary between 6-7%.