

Geographic Analysis

By:

MONIKA MANGLA

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 rate by Geographic region:

- The U.S. agency mortgage-backed securities market is among the largest and most liquid bond markets worldwide.
- States are classified into five regions: North Central(region 1), North East(region 2), South East(region 3), South West(region 4) and West(region 5).
- Since the decrease in prepayment rates as of 2013 not only has the demand for mortgage loans increased, the level of prepayments has dropped after its spike in 2009.
- US mortgage market have high LTV value as compared to other countries.
- Prepayment rates differ per region.
- In region 4, the South West, default rates are higher and prepayment rates are lower compared to the rest of the US.
- Prepayment rates are the highest in the South East (region 3).

2. Prepayment Rate by State:

- Vermont have high prepayment rate followed by Kentucky and Paragana.
- South west and west region states have almost same prepayment rates.
- Alabama, New Mexico, New Jersey and New Carolina have lowest prepayment rates.
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3. Total number of Mortgage Securities by state:

- Texas, Michigan, California, Florida and Illinois has highest number of Mortgage Securities where California is on top with 32K.
- Guatemala Honduras, Alaska, South Dakota have lowest number of Mortgage Securities.