

Data Preprocessing-

- Checked every column of dataset for null values and duplicate values.
- In columns like first time home buyer, PPM ,Number of Borrowers X values are present which are not available values. Replaced that values with the respective mode value of column.
- First payment date and maturity date columns shows date in number format. Converted number to date using formula [DATE(INT(C2/100),MOD(C2,100),1)].
- Created measure Prepayment_Rate using below formula

Prepayment_Rate =

```
VAR TotalRows = COUNTROWS('finalpr dataset')
VAR PrepaidCount =
    SUMX('finalpr dataset',
        IF(
            AND(
                'finalpr dataset'[OrigUPB] / 'finalpr dataset'[OrigLoanTerm]
                * 'finalpr dataset'[MonthsInRepayment] < 'finalpr dataset'
                [OrigUPB] * 0.2,'finalpr dataset'[OrigUPB] * 0.1 <
                'finalpr dataset'[OrigUPB] / 'finalpr dataset'[OrigLoanTerm] *
                'finalpr dataset'[MonthsInRepayment]
            ),1,0))
VAR PrepaymentRate = DIVIDE(PrepaidCount, TotalRows)
RETURN
SWITCH(
    TRUE(),
    ISBLANK(PrepaymentRate), BLANK(),PrepaymentRate
)
```

- Created Table with name data which shows prepayment rate for each state.

Dashboard -

1 .Imported data from Excel in power BI using get data option.Then check the data before loading and click on load option.

2 .First changed canvas background with color which is available in canvas background option.

KPI's-

3 .Then Created KPIs like Prepayment rate by geographic region, Total number of mortgage securities by state.

1. Prepayment rate by geographic region =firstly I have created new table for state wise prepayment rate and then taken an average of Prepayment_rate.
2. Total number of mortgage securities by state = Created measure Total Mortgage Securities using below formula

Total Mortgage Securities =

```
CALCULATE(  
    DISTINCTCOUNT('finalpr dataset'[LoanSeqNum]),  
    ALLEXCEPT('finalpr dataset', 'finalpr dataset'[PropertyState])  
)
```

then drag KPI card in canvas .Drag property state field in Target and Total mortgage securities measure in value field.Then It shows the value 496 i.e total mortgage securities by state.

Filters-

4 .Then Created Filters like Time Filters,Loan Status Filters,Delinquency PropertyType filter.

- **Time Filters**-I have taken MaturityDate field as a time filter.We can visualize effect on all parameters by moving slider between the dates.

- **Loan Status Filters**-For this filter ,Firstly I have created LoanStatus measure using below formula.

LoanStatus =

IF(

'finalpr dataset'[MonthsInRepayment] > 0 && 'finalpr dataset'[Prepayment_Rate] > 0,
"Active",

IF(

'finalpr dataset'[MonthsInRepayment] = 0 && 'finalpr
dataset'[Prepayment_Rate] > 0, "Paid Off",

IF(

'finalpr dataset'[MonthsInRepayment] > 0 && 'finalpr
dataset'[Prepayment_Rate] = 0, "Charged Off",
"Unknown"

)

)

)

After that we can check visualization as per loan status i.e active,paid off or charged off.

- **Delinquency Status** Filters-For this filter I have taken Ever Delinquent field first and then created slicer with a vertical list to show the options. we can apply 1 or 0 to check visualization effect on complete dashboard.
- **PropertyType filter**-For this filter I have taken PropertyType field in slicer to check visualization as per different property types.

Visualization Chart-

- **Map-** Created map by taking Prepayment_rate in color saturation option and PropertyState as a location. Then did the formatting such as color filling for max,min and center location.,changing background color etc.

It shows values of prepayment rate whenever we click on any state in map.

- **Bar Chart-** Created a bar chart with Prepayment_rate and state.I have applied filter and it shows top 15 observations.

It shows Prepayment rate for Each state

- **TreeMap-** Created tree map of prepayment rate and Region.In category field I have taken propertystate column and prepayment rate as values.

Observations-

- Total number of mortgage securities by state is 496.
- Prepayment rate by geographic region is 49.79%
- When we apply property type filter and select co- Condominium then it shows high prepayment rate for state WV and low for state PR.For CP-Cooperative only state NY shows value for prepayment rate.
- For Delinquency status 1 state WI shows prepayment(0.51) and PR state shows(0.20). For status 0 state SD shows high prepayment rate(0.62) and low for state PR(0.33) .
- When we apply maturity date between 2031 to 2043 then it shows 100% prepayment rate for most of the states.And between 2039 to 2043 only two states shows 100 percent prepayment rate(IN,KS)
- Whenever we click on any state in any chart total mortgage securities value changes for each state.

