**CREDIT RISK ANALYSIS REPORT**

**PURPOSE:** is to **analyze the likelihood of loan default** by identifying patterns and risk factors among borrowers; in order to make informed financial decisions and credit management strategies. It includes variables such as income level, employment length, loan amount, interest rate, loan intent, and prior default history.

**DATASET:** Credit risk dataset with borrower info, loan characteristics, and repayment status.

**DATA DICTIONARY**

| **Column Name** | **Description** |
| --- | --- |
| person\_age | Age of the loan applicant (in years). |
| person\_income | Annual income of the applicant in USD. |
| person\_home\_ownership | Type of home ownership (e.g., RENT, OWN, MORTGAGE). |
| person\_emp\_length | Length of employment in years. |
| loan\_intent | Purpose of the loan (e.g., EDUCATION, MEDICAL, PERSONAL). |
| loan\_grade | Credit grade assigned to the loan (from A to G, where A is the highest). |
| loan\_amnt | Total loan amount requested in USD. |
| loan\_int\_rate | Interest rate charged on the loan (as a percentage). |
| loan\_status | Loan repayment status (1 = defaulted, 0 = fully paid). |
| loan\_percent\_income | Loan amount as a percentage of the applicant’s income. |
| cb\_persoNo\_default\_oNo\_file | Indicates if applicant has previously defaulted on a loan (YES or NO). |
| cb\_person\_cred\_hist\_length | Length of the applicant’s credit history in years. |

**KEY INSIGHT:**

* **Loan Grade G** has the highest default rate, exceeding **20%**, indicating high-risk borrowers.
* **Lower income borrowers** (less than $20,000 annually) show a significantly higher tendency to default.
* **Borrowers with prior defaults** are nearly **twice as likely** to default again compared to those without.
* **Short employment history** (especially less than 2 years) is linked to higher default risk.
* **Larger loan amounts** and **higher interest rates** correlate with increased likelihood of default.
* **Loan purpose** like **debt consolidation, home improvement and medicals** affect default rates, showing consistently higher risks.

**DATA PREPARATION**

**Source**: credit\_risk\_dataset.csv from Kaggle.

**Cleaning Steps**

* Filled missing loan\_int\_rate and person\_emp\_length with 0.
* Filtered out employment lengths over 12 years.
* Categorized income, loan size, and employment into bins.

**Transformations**:

* Created calculated columns**: income bracket, loan\_size\_category, default rate, total loans, avg interest rate, default status**.

**KEY METRICS & KPIS**

* Total Loans: **33,000**
* Defaulted Loans: **7,107**
* Default Rate (%): **21.81%**
* Average Interest Rate: **9.96%**

**INSIGHTS BY SEGMENT**

**1. Loan Grade**

* **Insight**: Higher-grade loans (A, B, C) have significantly lower default rates compared to lower grades (D, E, F, G).
* **Question:** Which Loan Grades Have the Highest Default Rates?
* **Chart Title:** Default Rate by Loan Grade

**2. Income Bracket**

* **Insight**: Default rate among low-income borrowers (<20k) is higher at **81.03%** compared to high-income borrowers (>50k) at **14.08%.**
* **Question: *Do Lower-Income Borrowers Default More****?*
* **Chart Title:** Default Rate by Income Level

**3. Loan Size Category**

* **Insight**: **Medium** to **large** loans show a slight increase in default risk unlike the small and very small loan sizes.
* **Question**: ***Are Larger Loans Riskier?***
* **Chart Title:** Default Risk by Loan Size Category

**4. Employment Length**

* **Insight**: Borrowers with longer employment history (6–12 years) show slightly lower default rates than those with under 2 years.
* **Question**: ***Does Job Stability Reduce Default Risk?***
* **Chart Title:** Default Rate by Employment Length

**5. Prior Defaults**

* **Insight**: Borrowers with past defaults show a significantly higher chance of defaulting again.
* **Question**: ***Are Past Defaulters More Likely to Default Again?***
* **Chart Title:** Default Rate by Prior Defaults

**CONCLUSION**

The analysis highlights key drivers of loan default, including low credit grades, low income, short employment length, high interest rates, and past defaults. These factors collectively increase the likelihood of borrower default and should be closely monitored in credit evaluations.

**RECOMMENDATIONS**

* Prioritize lending to borrowers with **higher credit grades** (A–C).
* Apply **stricter checks** for applicants with **low income** or **short job history**.
* Implement **risk-based interest rates** for borrowers with **larger loans** or **higher default probability**.
* Flag and further assess borrowers with a **history of defaults** before approval.