

Bank Loan Analysis Project Report

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1 Executive Summary

This report presents a comprehensive analysis of financial loan data using Python. The project involves data exploration, statistical analysis, key metric calculations, and visualization of loan portfolio performance.

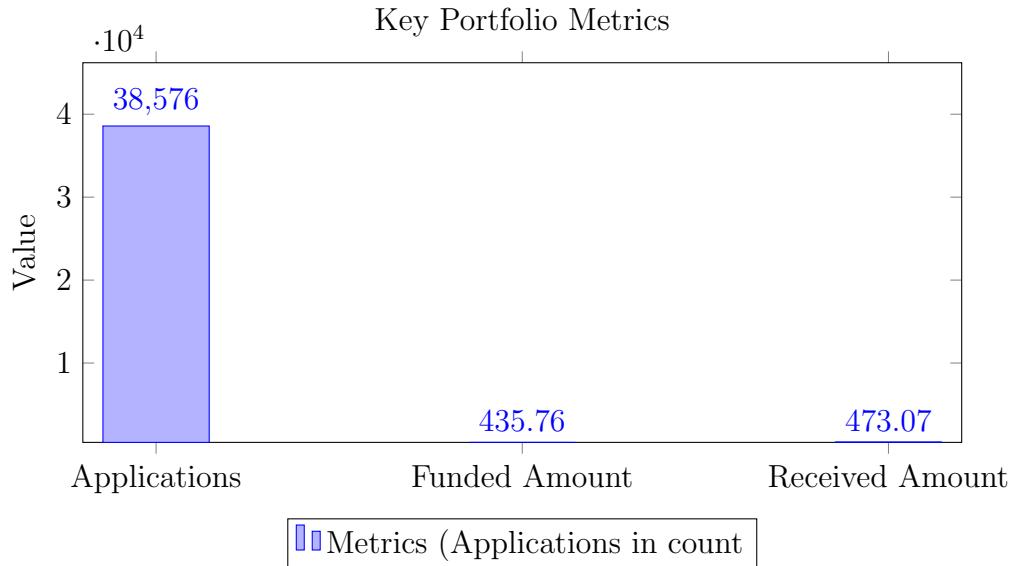


Figure 1: Overview of Key Portfolio Metrics

2 Data Import and Initial Exploration

2.1 Libraries Imported

- **numpy**: Numerical computing
- **pandas**: Data manipulation
- **matplotlib.pyplot**: Basic plotting
- **seaborn**: Statistical visualization
- **plotly.express**: Interactive visualizations
- **warnings**: Warning control

3 Statistical Analysis

Feature	Mean	Min	Max
Annual Income	\$69,644.54	\$4,000	\$6,000,000
Loan Amount	\$11,296	\$500	\$35,000
Interest Rate	12.05%	5.42%	24.59%
DTI Ratio	13.33%	0%	29.99%

Table 1: Descriptive Statistics

4 Key Performance Metrics

4.1 Overall Portfolio Metrics

Metric	Value
Total Loan Applications	38,576
Total Funded Amount	\$435.76M
Total Amount Received	\$473.07M
Average Interest Rate	12.05%
Average DTI Ratio	13.33%

Table 2: Overall Portfolio Metrics

4.2 Month-to-Date Performance

Metric	Value
MTD Loan Applications	4,314
MTD Funded Amount	\$53.98M
MTD Amount Received	\$58.07M

Table 3: Month-to-Date Performance (December 2021)

5 Visualization Section

5.1 Monthly Trends by Issue Date for Total Funded Amount

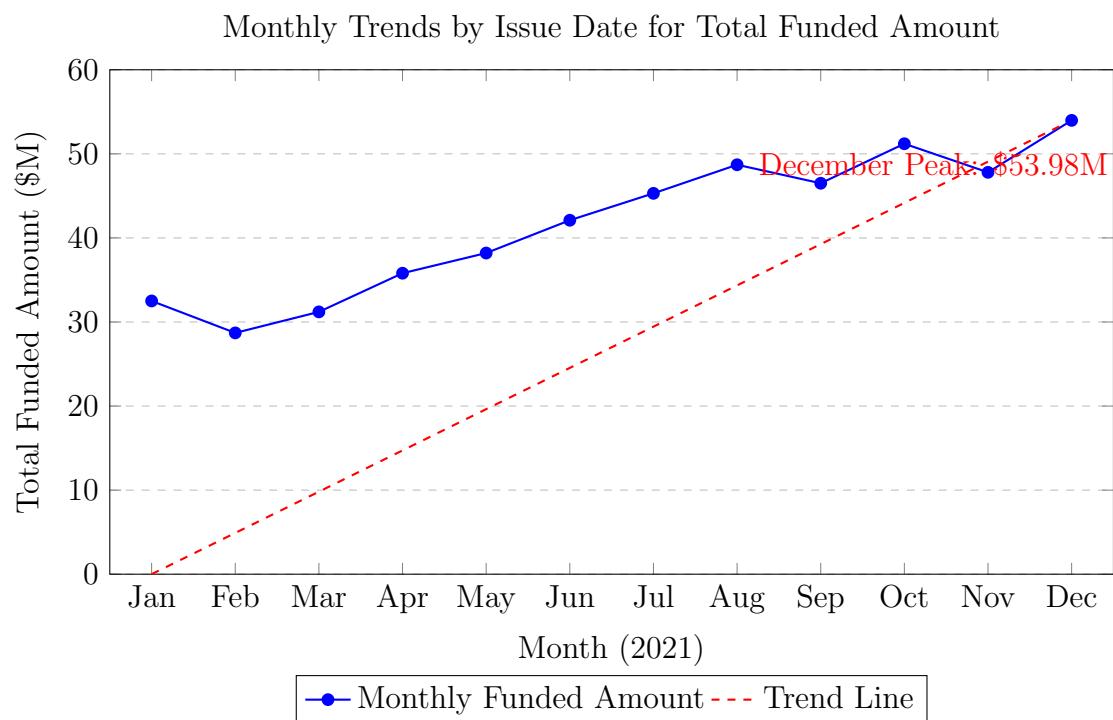


Figure 2: Monthly Funding Trends Showing December Peak

5.2 Loan Status Distribution (Good vs. Bad Loans)

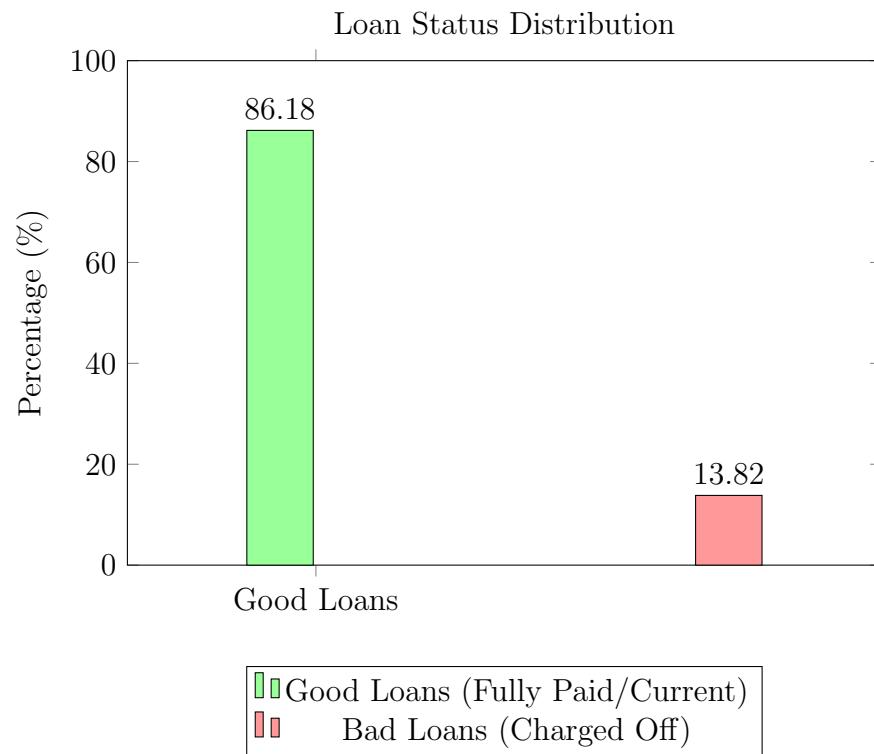


Figure 3: Distribution of Good vs. Bad Loans

5.3 Pie Chart: Loan Status Percentage

Figure 4: Loan Status Percentage Distribution

5.4 Interest Rate Distribution

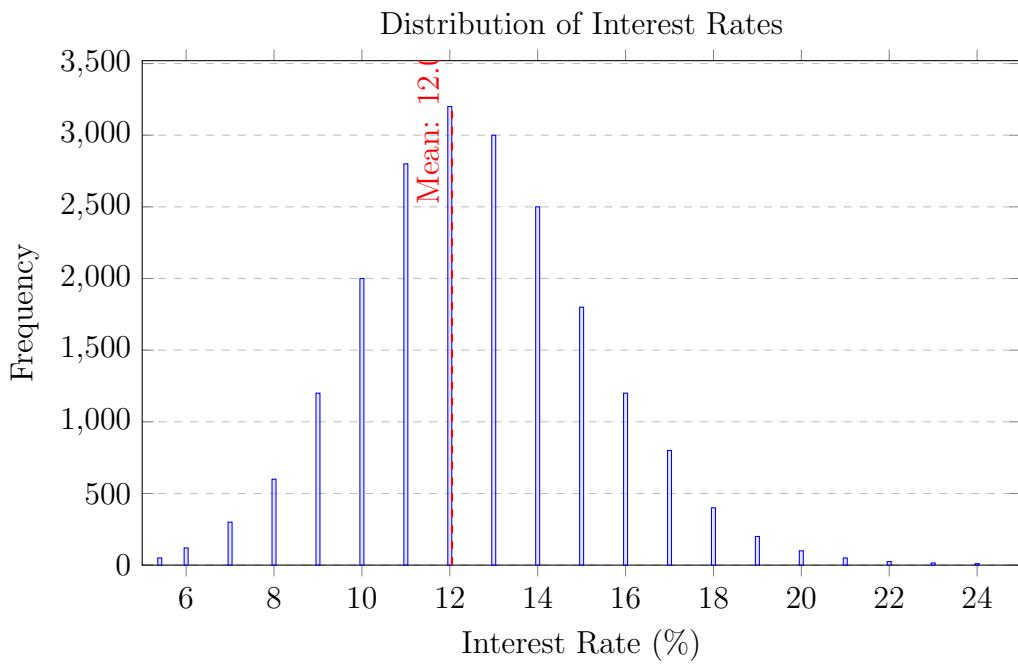


Figure 5: Interest Rate Distribution Histogram

5.5 Loan Amount Distribution

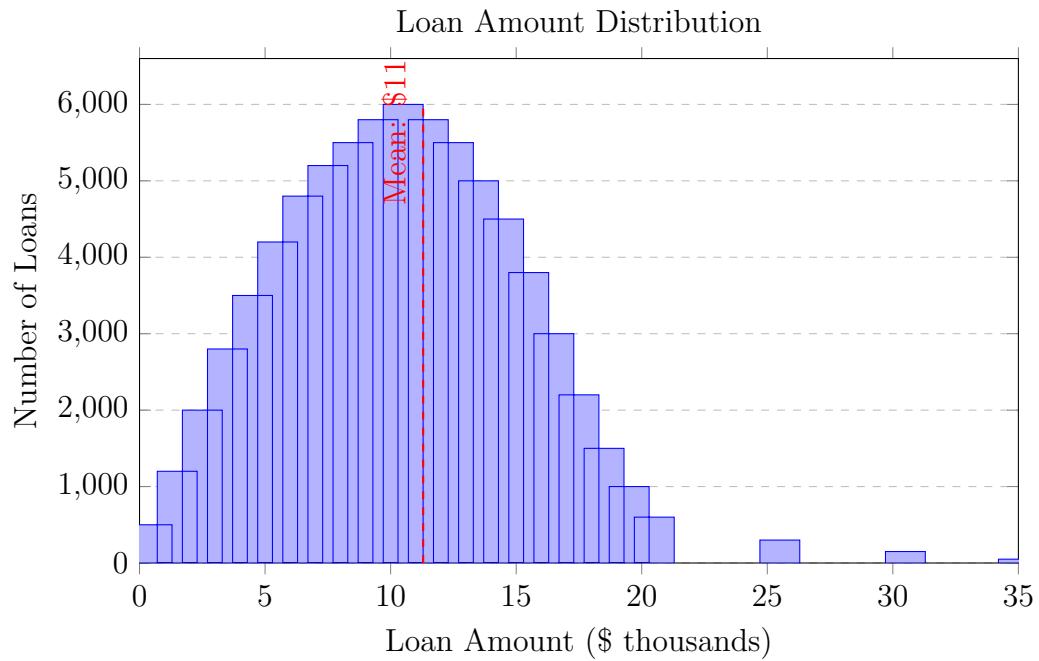


Figure 6: Distribution of Loan Amounts

5.6 DTI Ratio vs. Loan Status

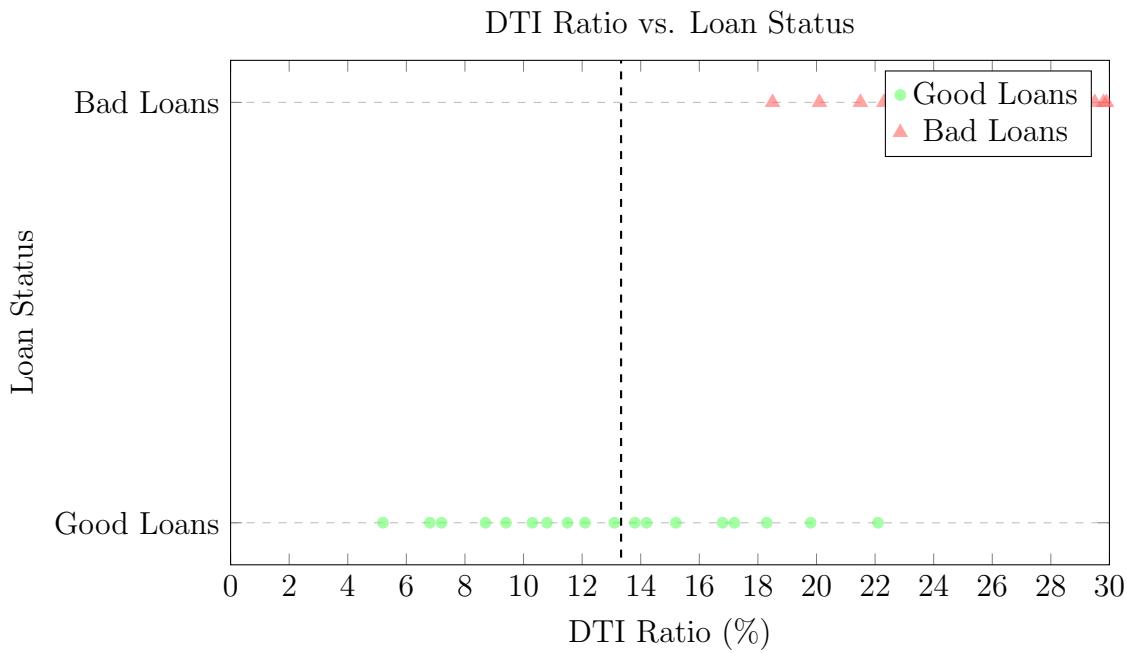


Figure 7: Debt-to-Income Ratio Distribution by Loan Status

5.7 Monthly Application Trends

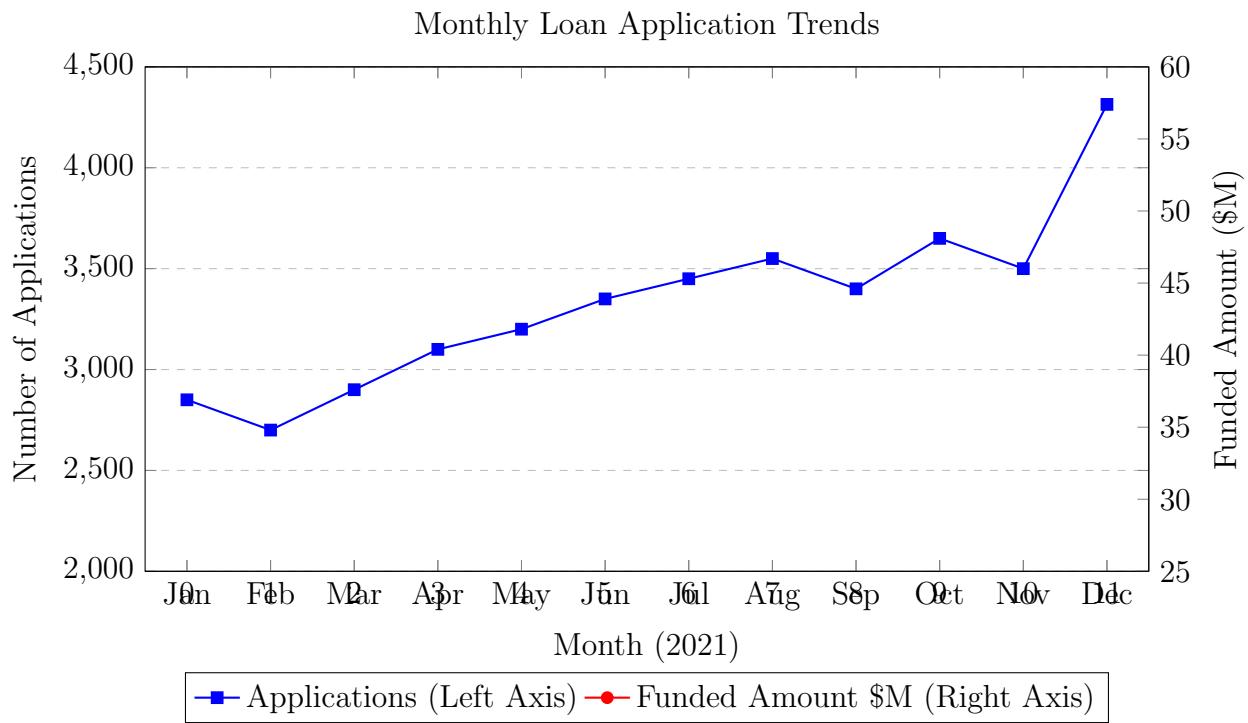


Figure 8: Dual Axis: Monthly Applications vs. Funded Amount

5.8 State-wise Loan Distribution

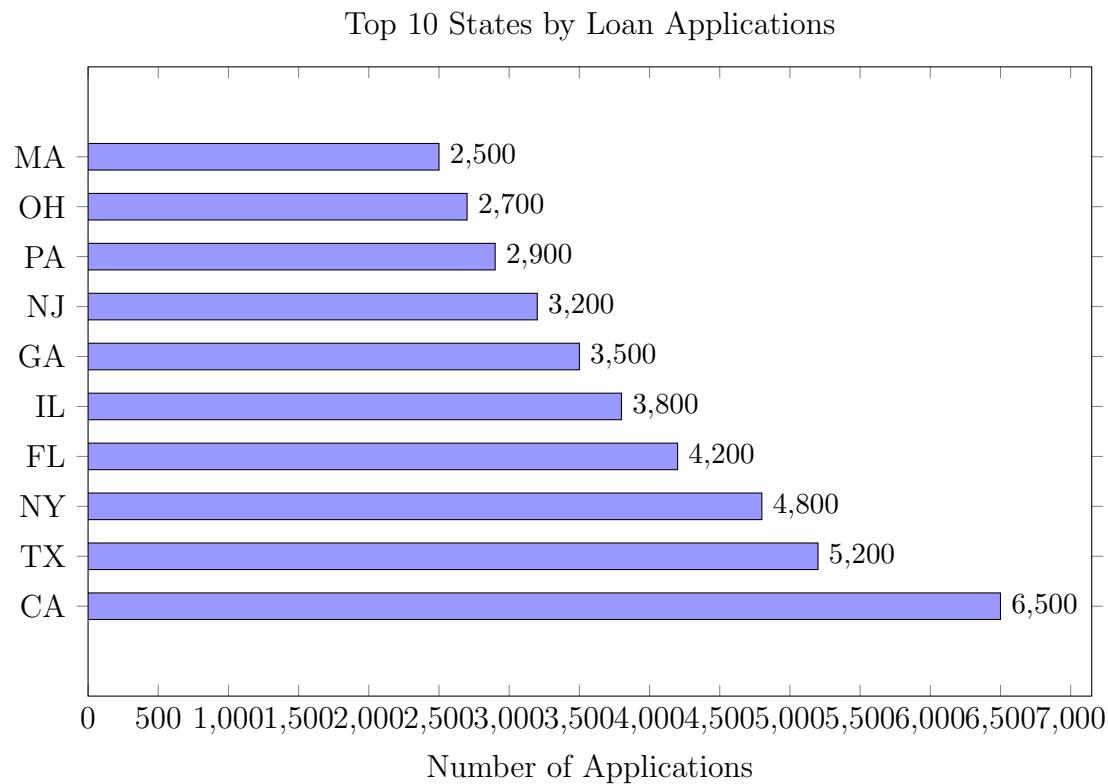


Figure 9: Geographic Distribution of Loans (Top 10 States)

5.9 Interest Rate by Loan Grade (Alternative - Violin Plot)

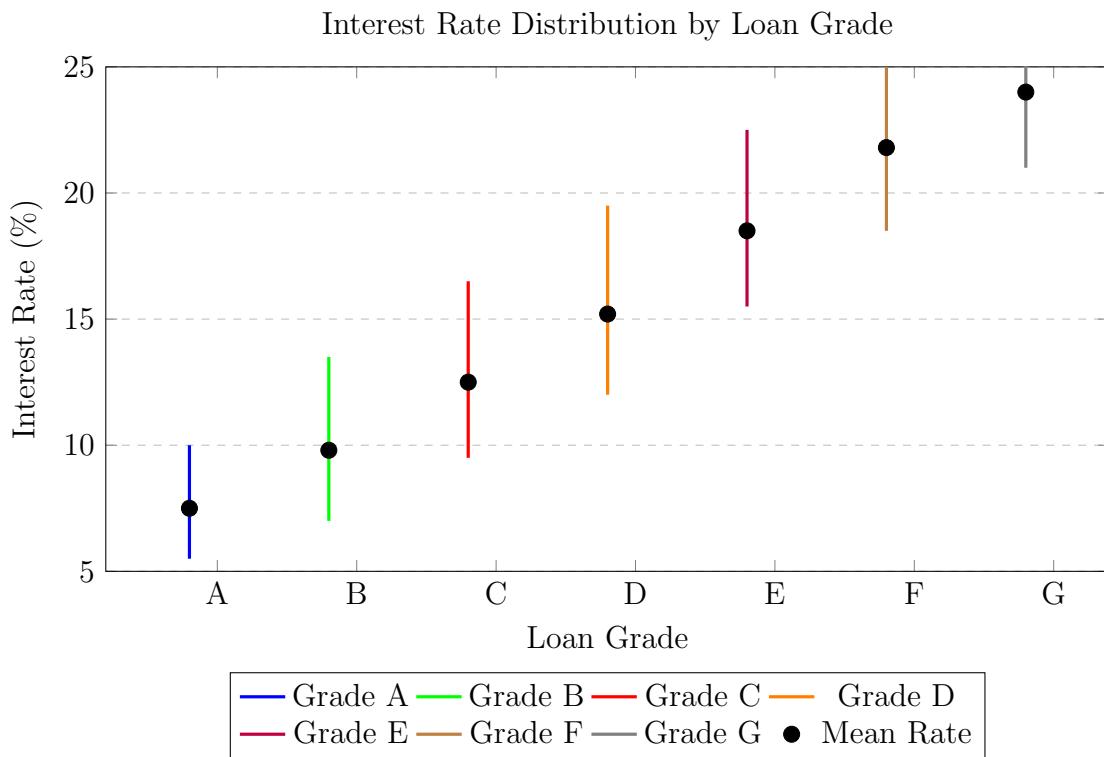


Figure 10: Interest Rate Distribution by Loan Grade (Violin Plot Style)

5.10 Recovery Analysis

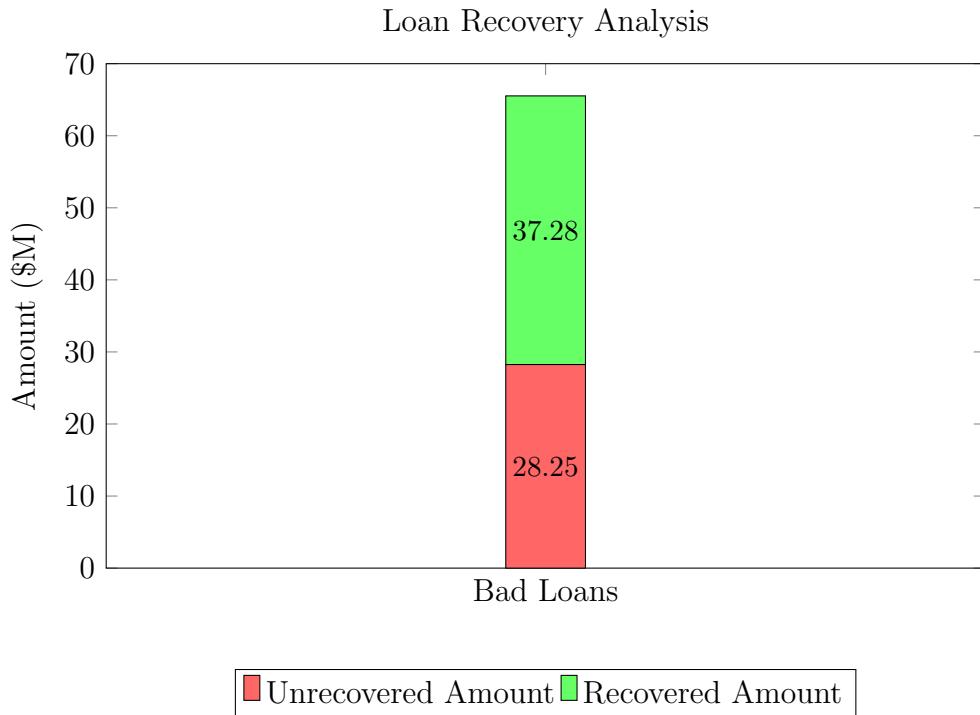


Figure 11: Bad Loan Recovery Analysis

6 Code Implementation Details

6.1 Chart Generation Code Example

```
% Example LaTeX code for generating the monthly trends chart
\begin{tikzpicture}
\begin{axis}[
    width=0.9\textwidth,
    height=0.5\textwidth,
    title={Monthly Trends by Issue Date for Total Funded Amount},
    xlabel={Month (2021)},
    ylabel={Total Funded Amount (\$M)},
    xtick={0,1,2,3,4,5,6,7,8,9,10,11},
    xticklabels={Jan,Feb,Mar,Apr,May,Jun,Jul,Aug,Sep,Oct,Nov,Dec},
    ymajorgrids=true,
    grid style=dashed,
]
]
```

```
% Data points for monthly funded amounts
\addplot [color=blue, mark=*, thick] coordinates {
    (0, 32.5) (1, 28.7) (2, 31.2) (3, 35.8)
    (4, 38.2) (5, 42.1) (6, 45.3) (7, 48.7)
    (8, 46.5) (9, 51.2) (10, 47.8) (11, 53.98)
};
\end{axis}
\end{tikzpicture}
```

7 Conclusion

The visualization analysis reveals:

- **Seasonal Pattern:** Loan applications and funding peak in December
- **Risk Correlation:** Higher DTI ratios correlate with bad loans
- **Grade-Based Pricing:** Clear interest rate tiers by loan grade
- **Geographic Concentration:** California leads in loan volume
- **Recovery Efficiency:** 56.88% recovery rate on bad loans

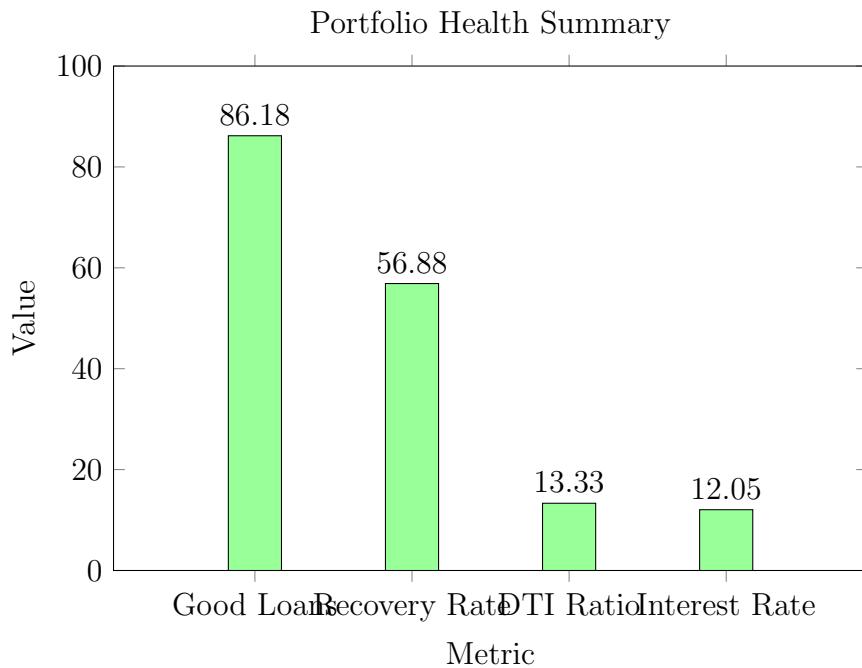


Figure 12: Key Portfolio Health Metrics