Credit Risk Analysis

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Context & Objectives

Situation

Data: Loans from a FinTech lending platform over the period 2007-2014.
Including information on borrower characteristics, loan terms, repayment history, and loan status.

Objectives

- Analyzing the factors affecting the borrowing behavior and repayment ability
- Differentiating Good vs Bad Loan
- Proposing Strategies for better lending

Methodology

Loan Classification

Bad:
Not good status (Charged Off, Default, In Grace Period, Late) & Recovery Rate < 0.4

Good:
1. Loan status = Fully Paid
2. Charged Off/ Default/ In Grace Period/ Late & Recovery Rate > 0.7
3. Loan status = Current & Loan age > 0.4

Neutral:
Else

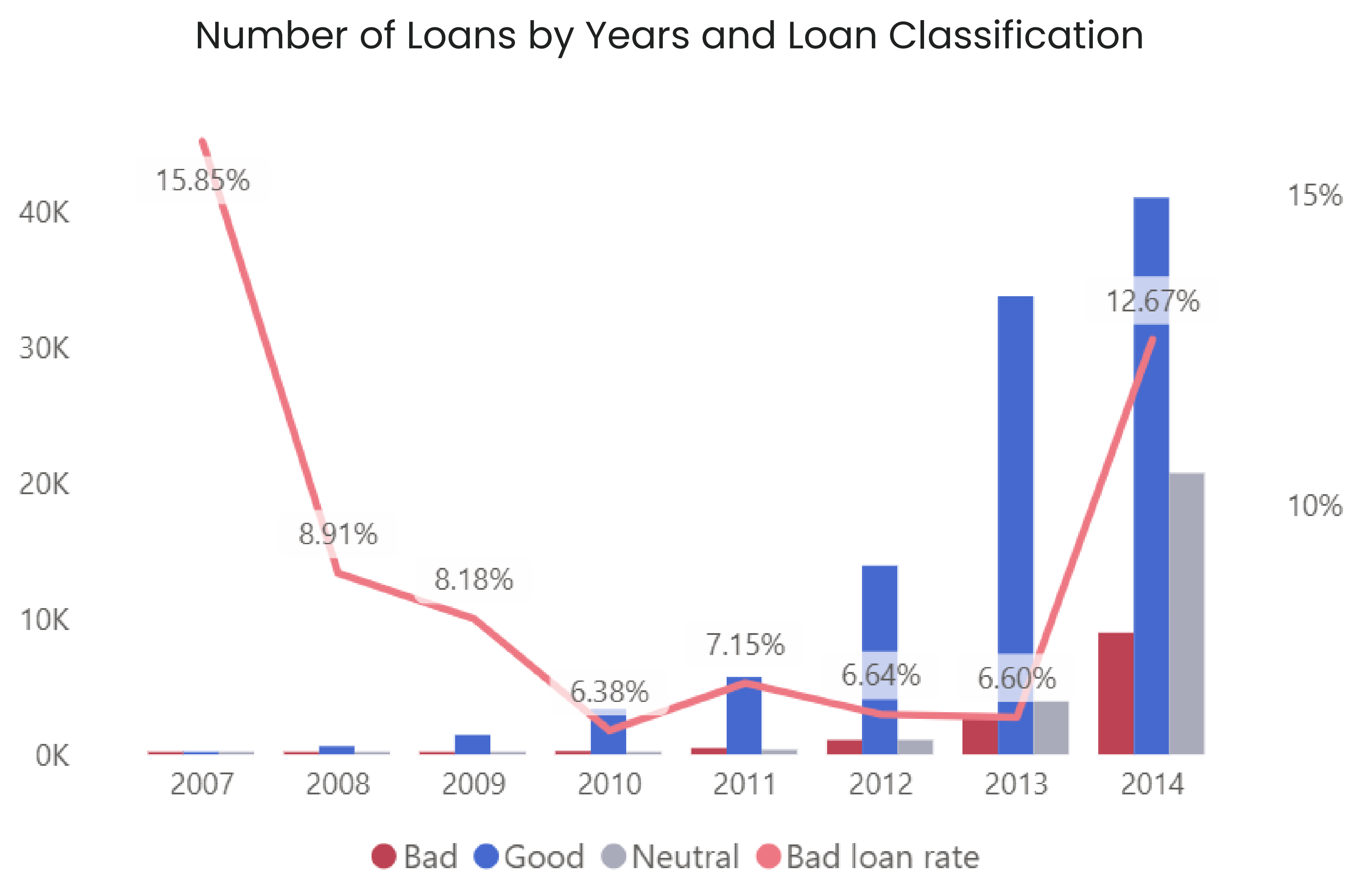
Factors

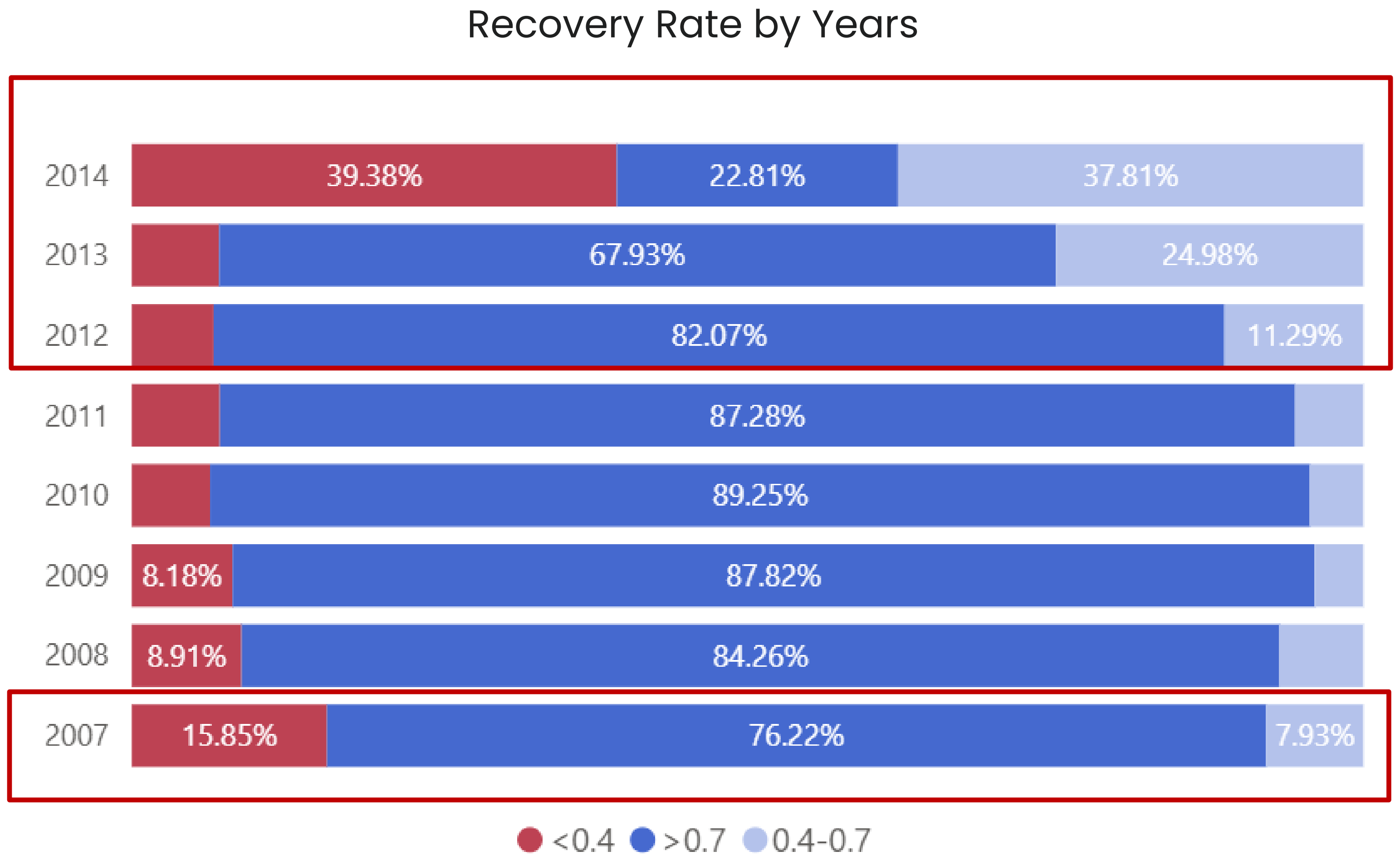
- Credit profile
- Loan structure
- Financial capability
- Debt management pattern

Loan applications went up, while the bad rate was high and fluctuated (~6% - 16%)

The numbers of loans **increased** over time.
The bad rate decreased between 2007 and 2010, then was stable until **rising significantly** (+6.07%) in 2014.

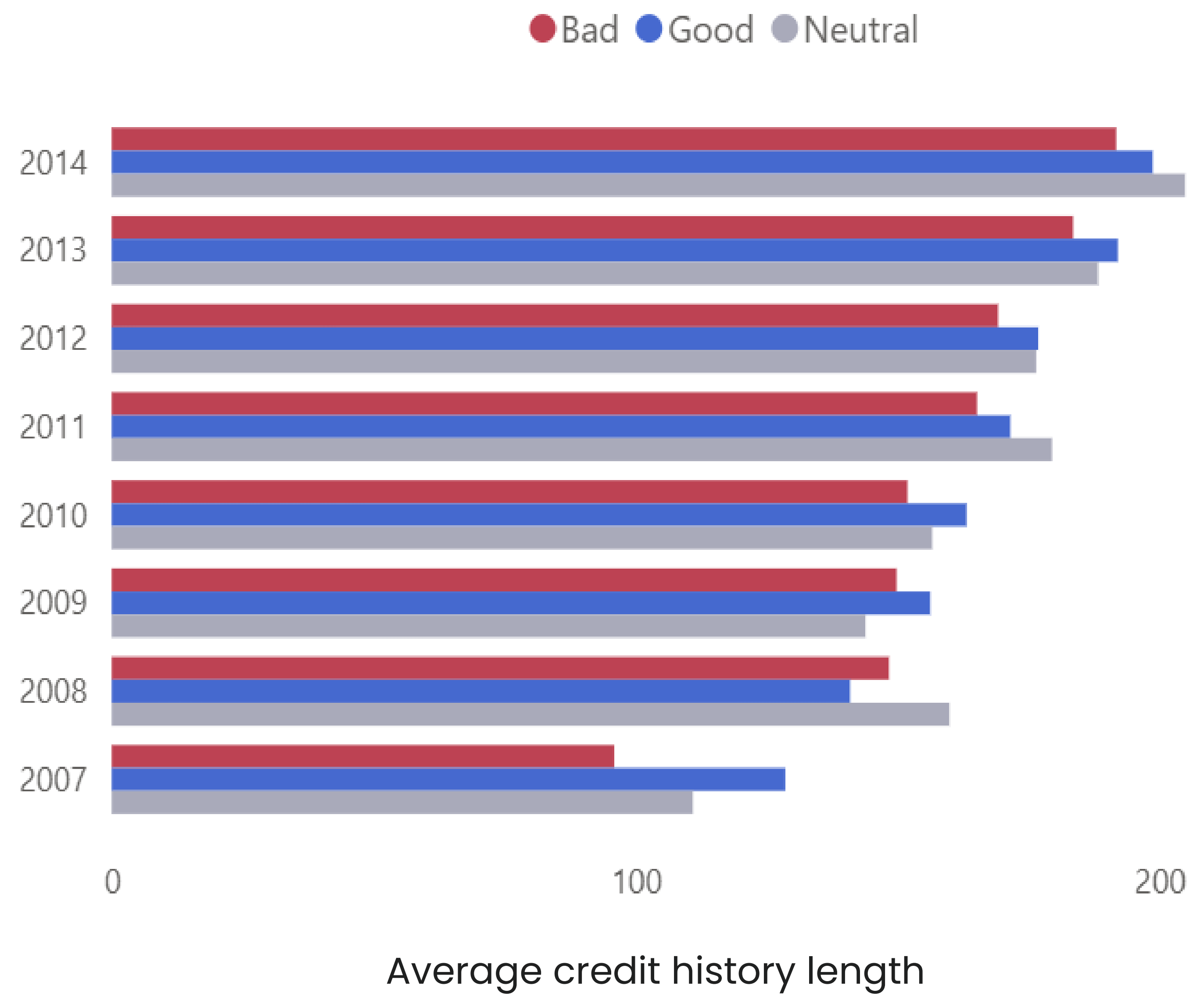
Quite high recovery rate, with above 85% of loans having recovery rate bigger than 70% demonstrated high recovery efficiency.
Noticable cases: 2007, 2012-2014.





Customers having bad loans tended to have shorter credit histories than the others

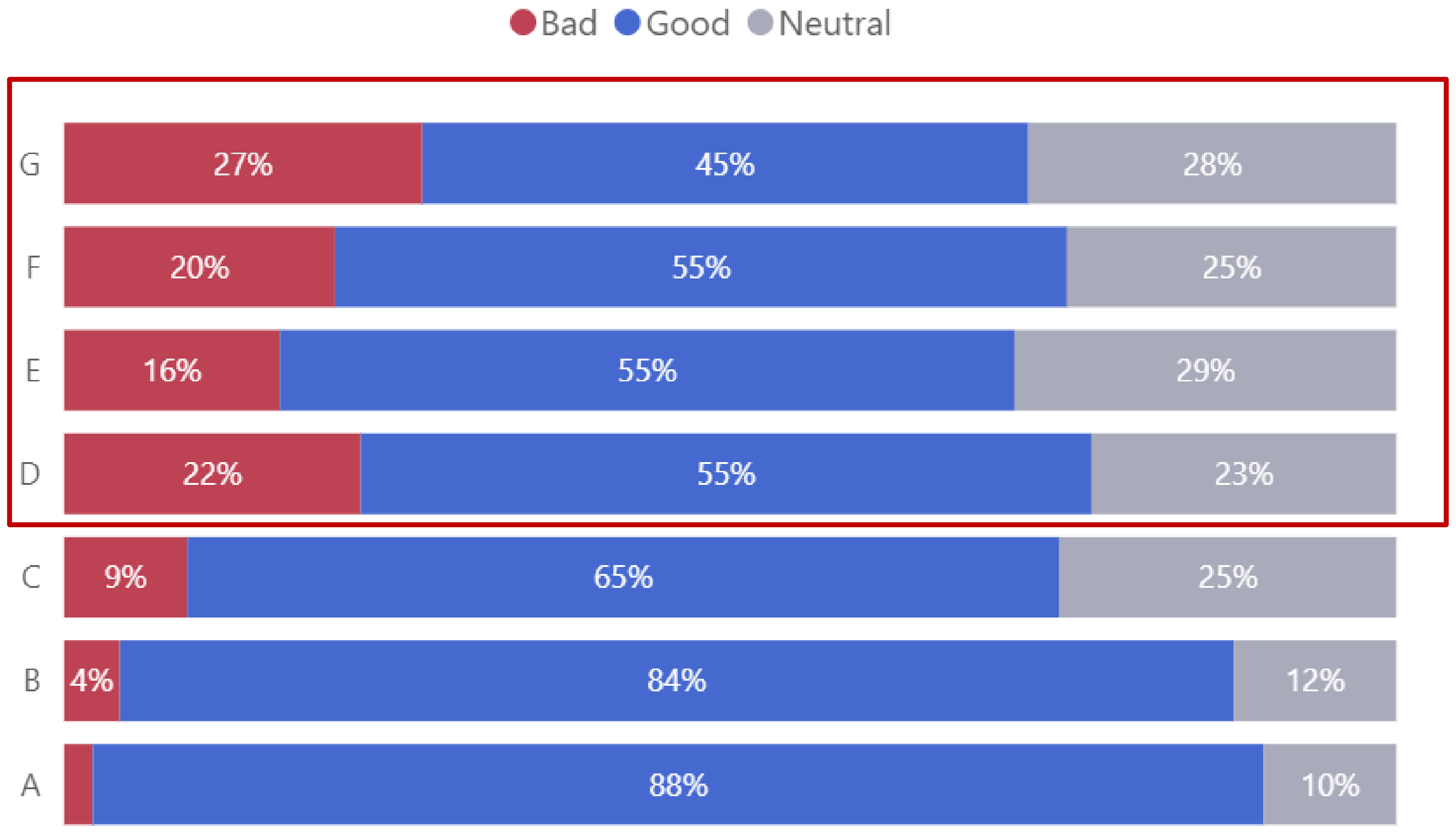
The largest gap between Good and Bad loans occurred in 2007 (33 days), while in later years the gap narrowed, suggesting that borrowers with shorter credit histories were increasingly represented across all categories.



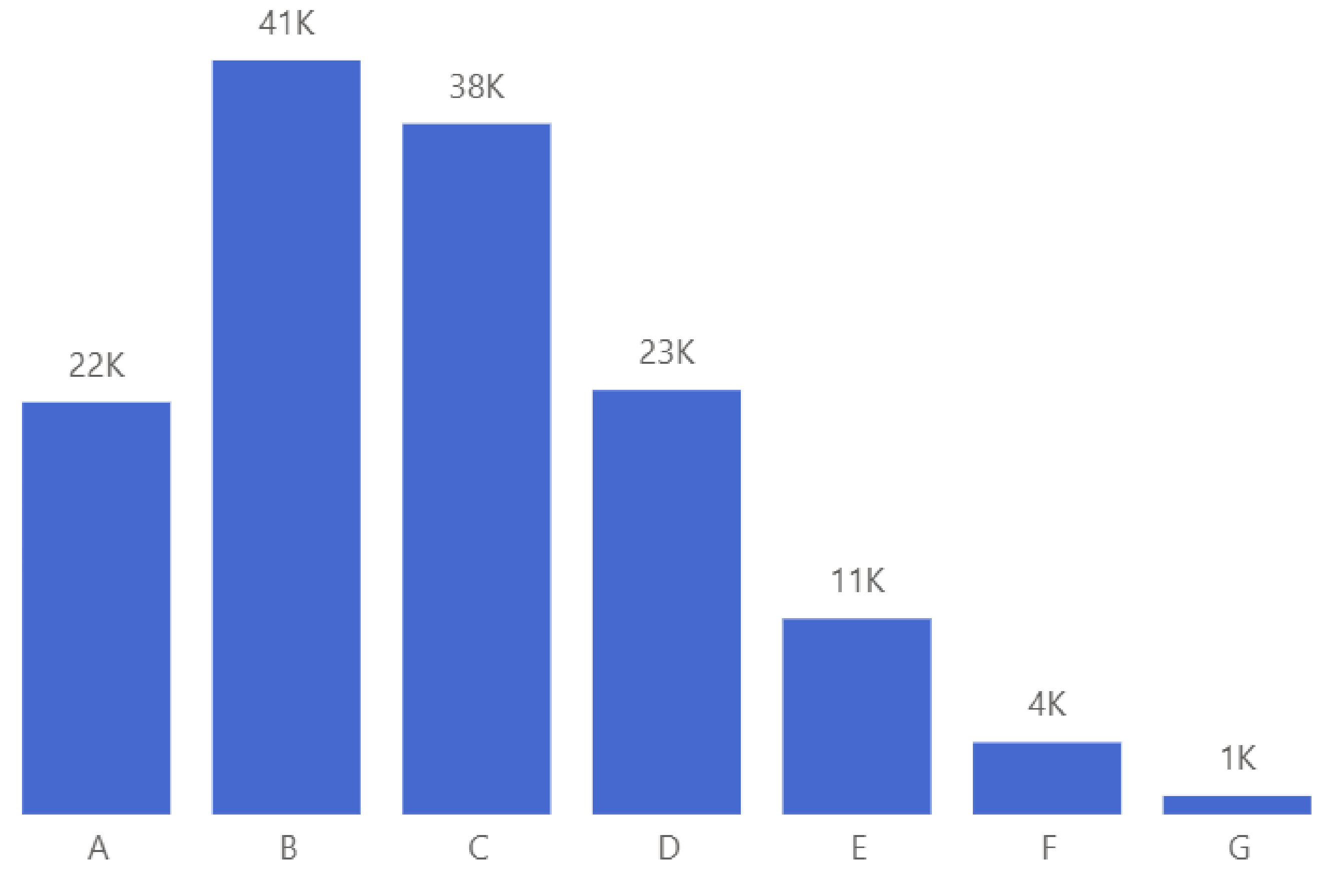
Loans for customers in low grades (D to G) lead to higher risks

People in groups D to G tend to take out bad loans significantly (16-27%) more than those in groups A to C (2-9%).

This company concentrated on lending to borrowers who were in Low - Moderate Risk group (grade A, B and C) (**72%**).



Loan Classification by Grades

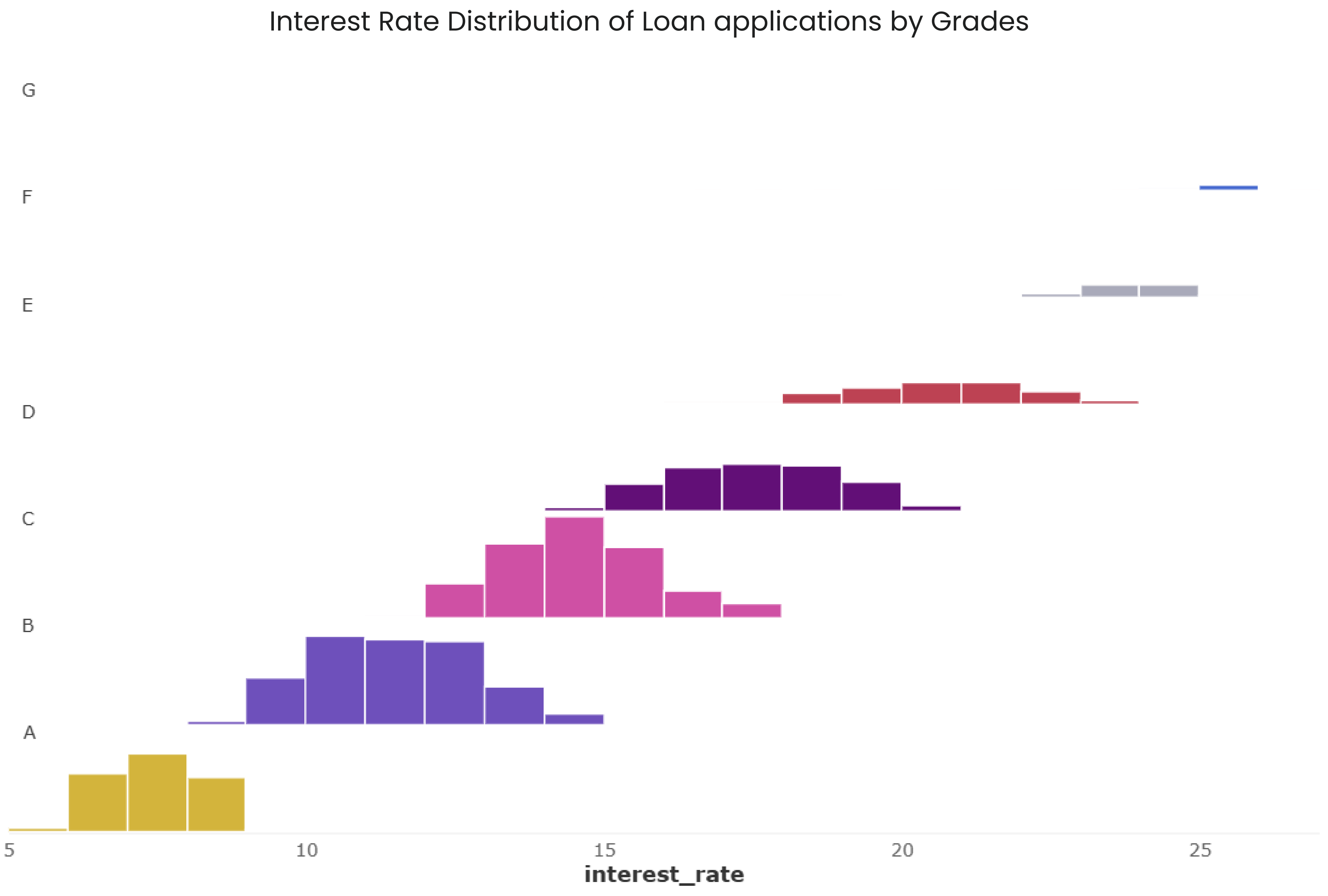


Number of Loan applications by Grades

Significantly higher rates for lower credit grades

As the grade decreases from B → G, the interest rate shifts upward, indicating **higher borrowing costs for riskier borrowers.**

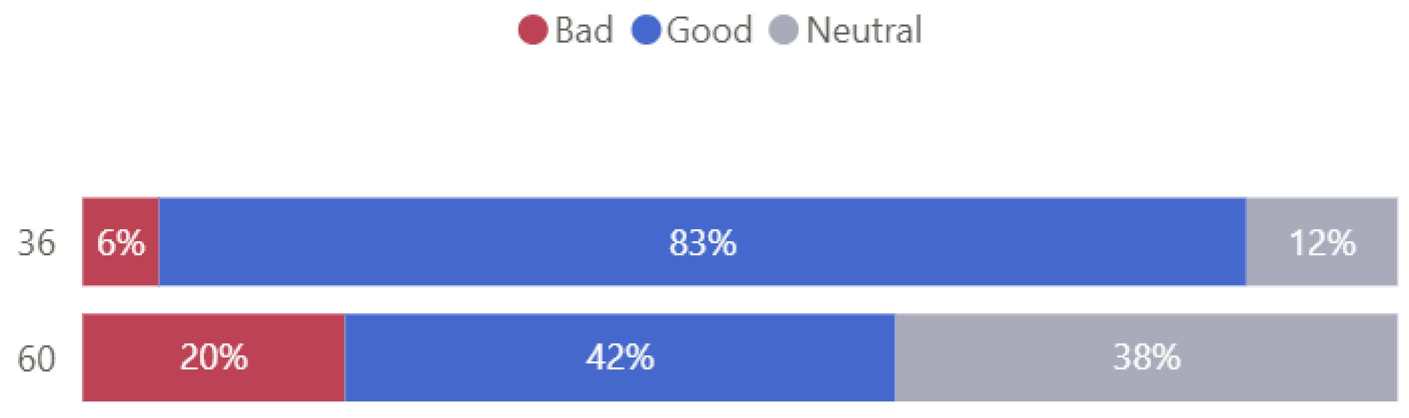
The distributions for higher grades (A–C) are narrower, while lower grades (D–G) tend to have wider spreads, suggesting more variability in pricing for riskier borrowers.



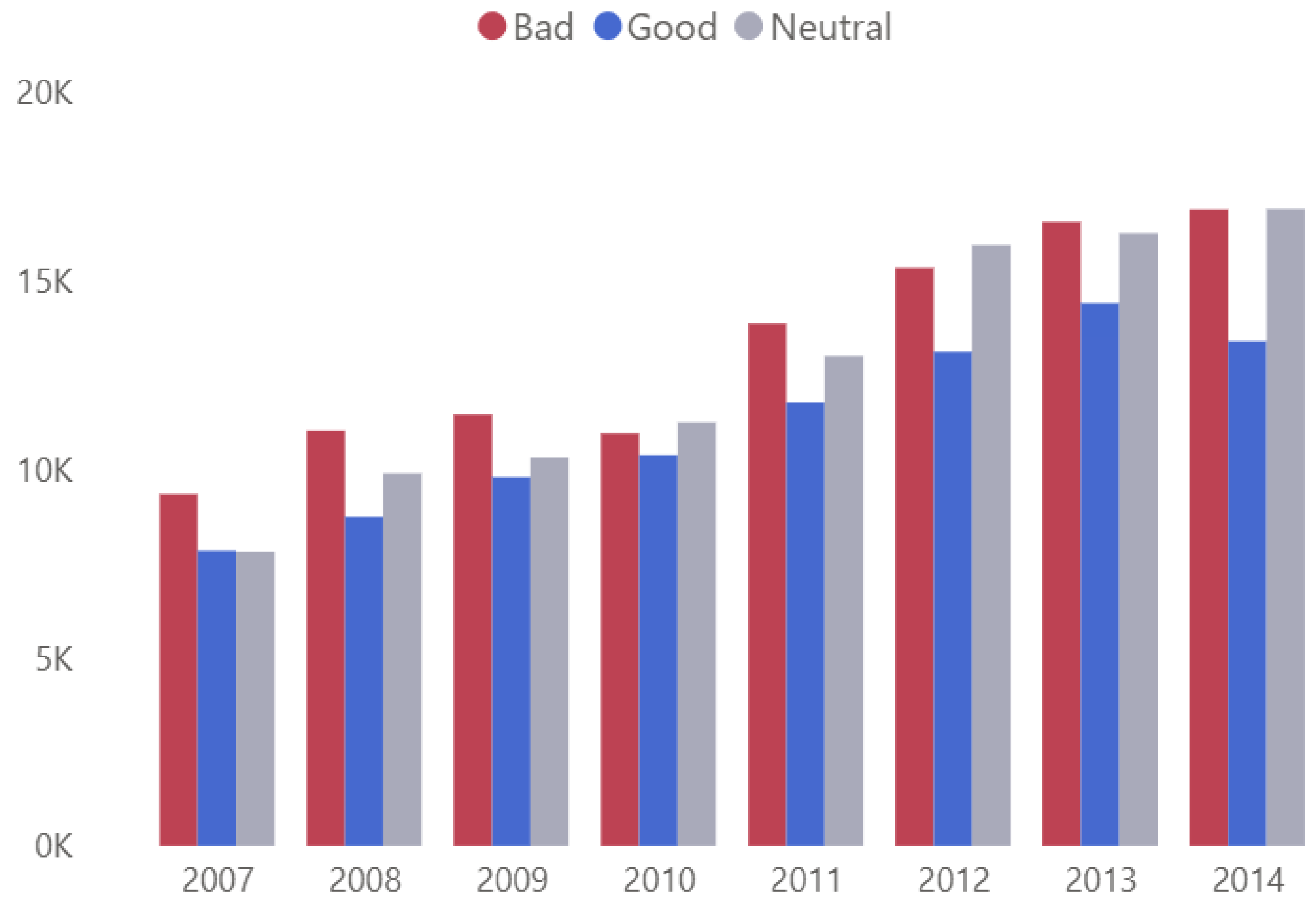
The percentage of bad loans with long term is 3 times that of short term

Longer-term loans (60 months) are associated with a higher proportion of Bad loans and a significantly lower proportion of Good loans compared to shorter-term loans (36 months)

Loan amount increased gradually.
Bad loans generally had the highest loan amounts.



Loan Classification by Term

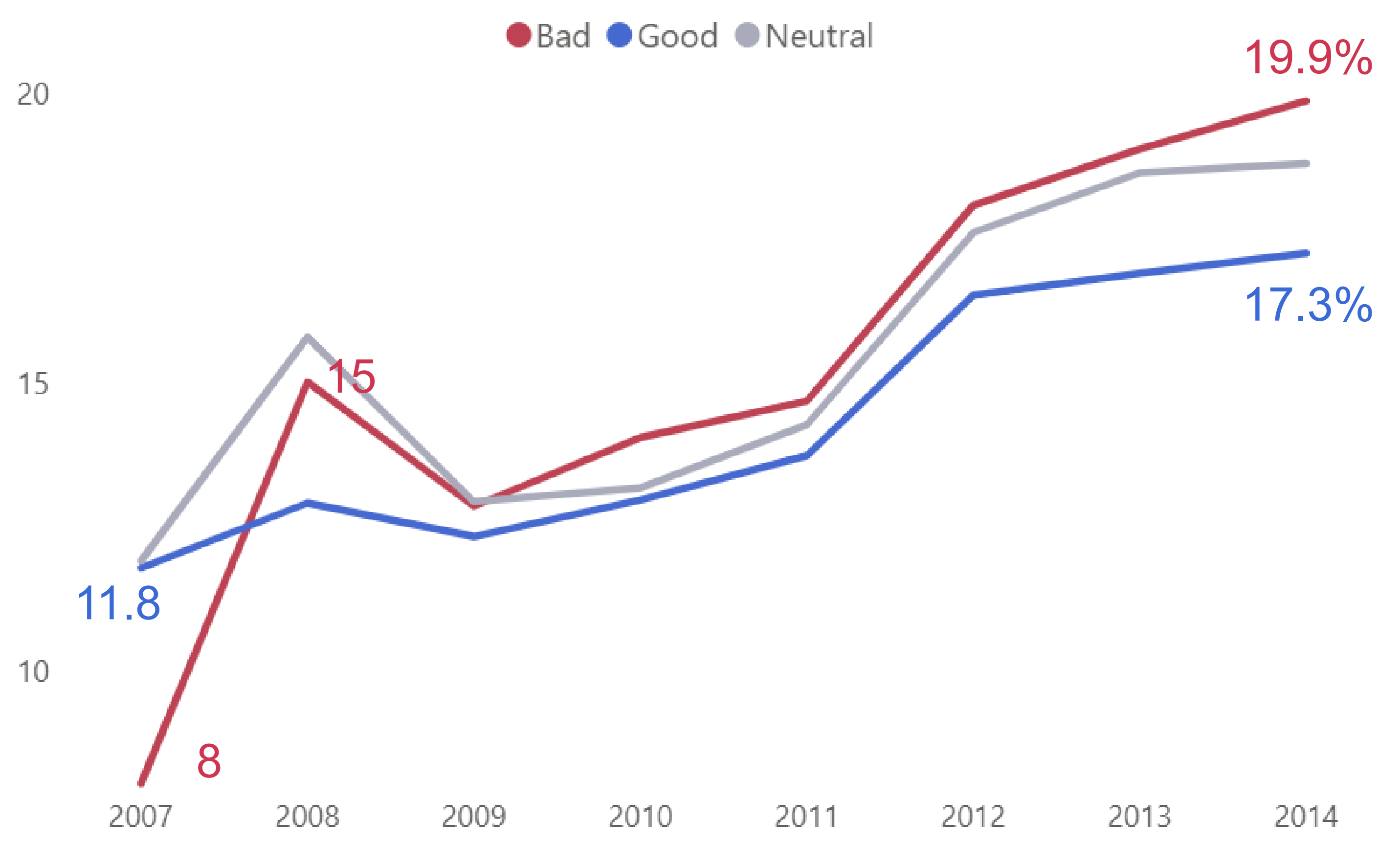


Average of loan amount by Year and Loan Classification

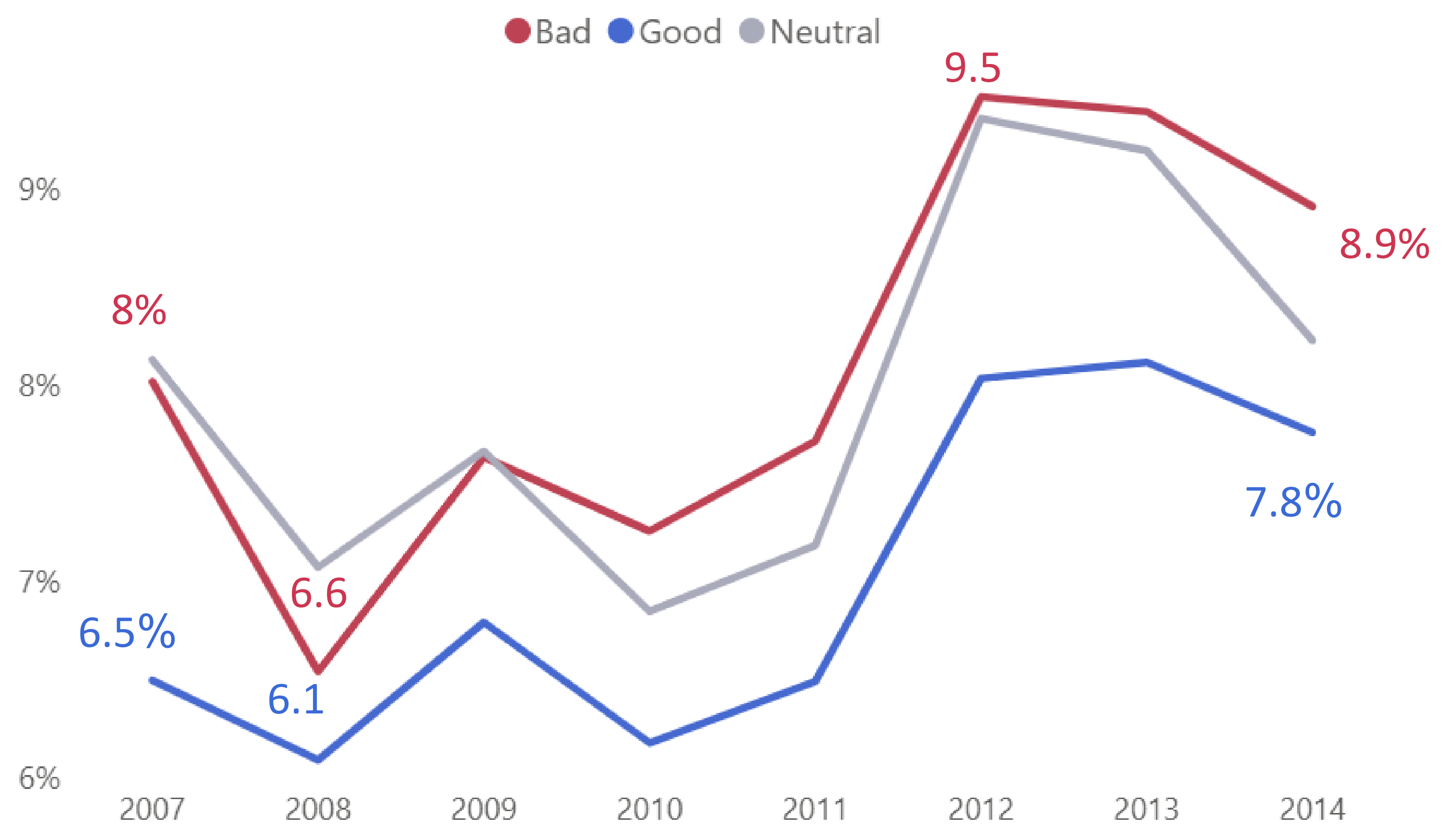
Borrowers with bad loans carry higher debt loads and repayment burdens

The debt to income ratio and installment to income ratio climbed (+7%, +2%).
Average debt to income/ installment to income ratio of bad loans was often higher than that of good and neutral ones.

Average debt to income ratio by Year and Loan Classification



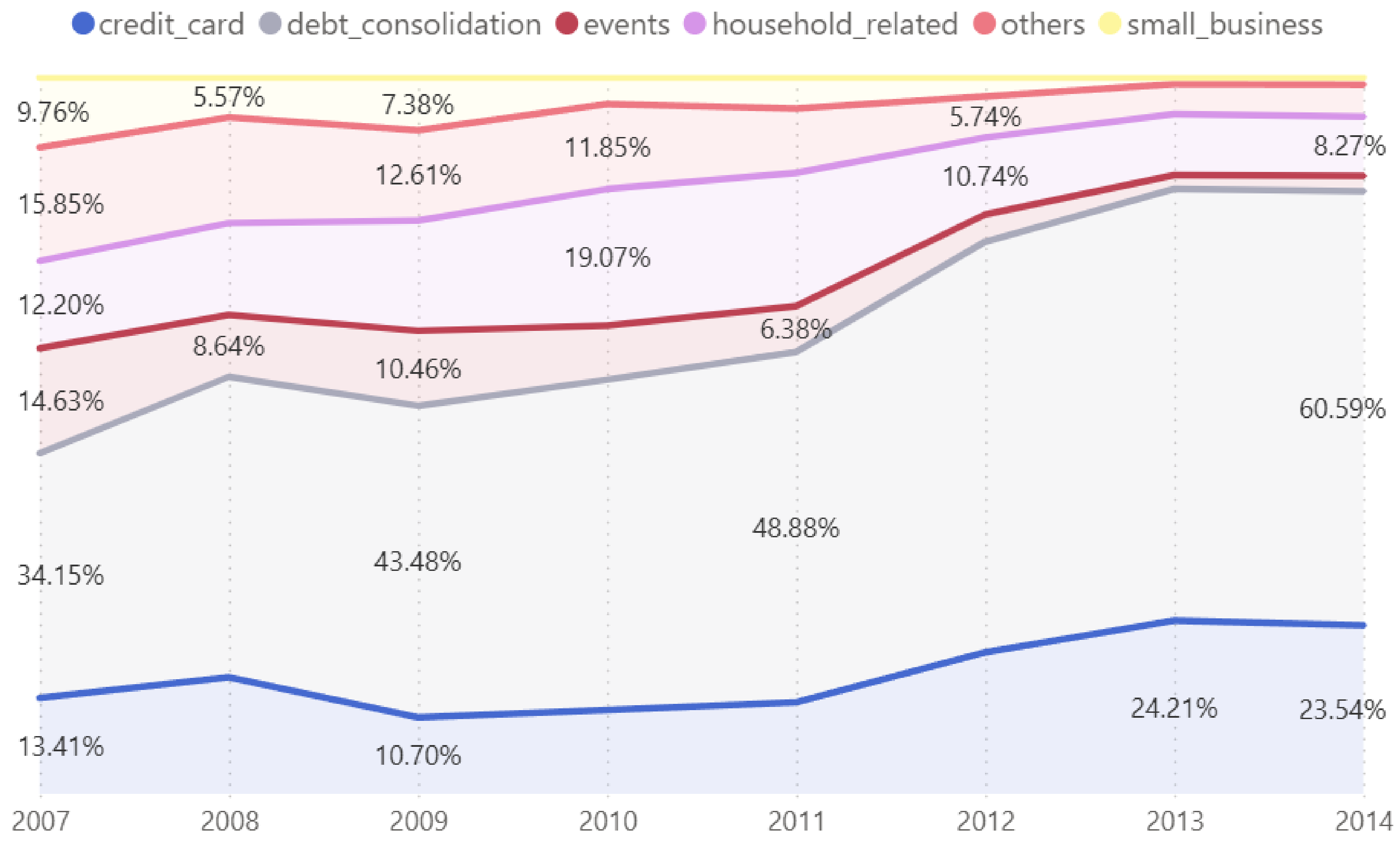
Average installment to income ratio by Year and Loan Classification



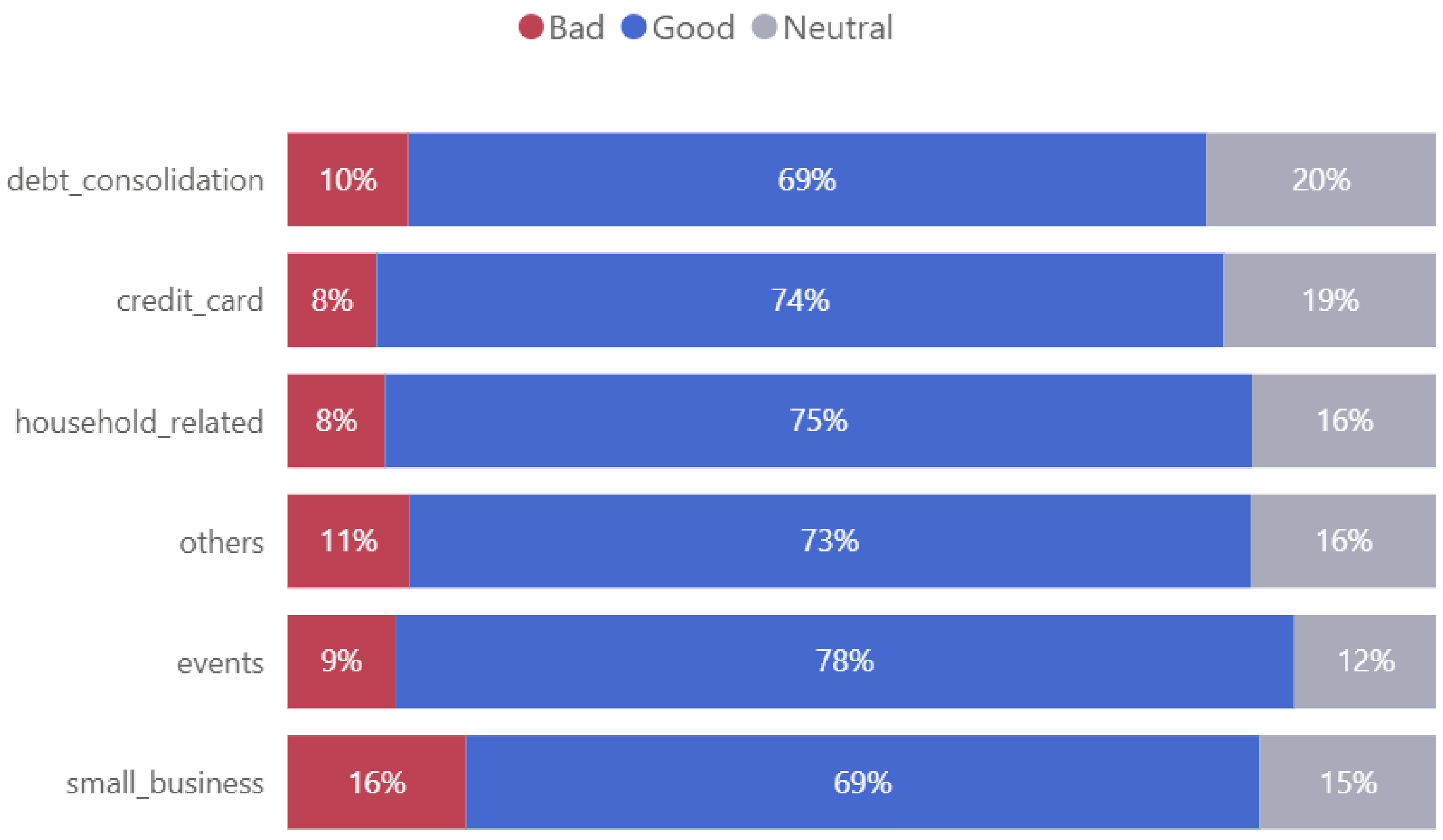
While debt consolidation is the most common purpose, small business loans carry the highest risk

Debt consolidation dominates the loan purposes, growing from ~34% in 2007 to over 60% by 2012–2014.
Credit card loans hold a stable share, dipping around 2009 and then rising again after 2011, reaching ~24% in 2013.

Small business loans stand out with 16% bad loans, possibly due to business risk and market conditions.



Loan Purposes

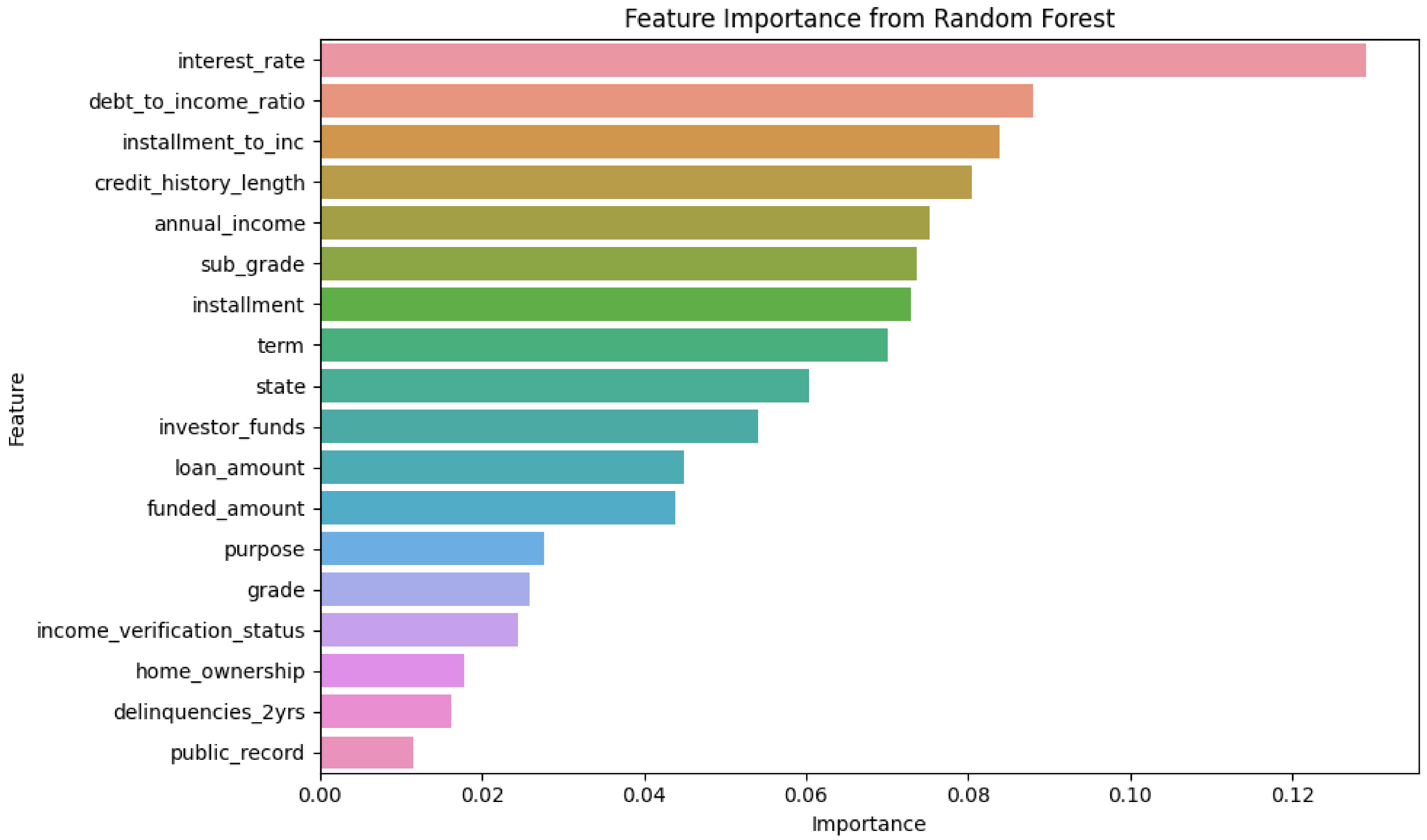


Classification by Loan Purposes

Identify high-impact factors by Feature importance

- Top influencer:
interest_rate is by far the most important feature (**13%**)

- Moderate importance:
debt_to_income_ratio,
installment_to_inc,
credit_history_length,
annual_income,
sub_grade,
installment,
term



Recommended Strategy

Pre-lending

- Customer Assessment (KYC & Anti-Money Laundering)
- Credit worthiness Evaluation
- Loan Suitability Assessment

Lending

- Credit Scoring & Approval Decision
- Loan Structuring Proposal
- Approval Control
- Disbursement

Post-lending

- Monitoring & Early Warning
- Repayment Reminders
- Debt Collection & Non-Performing Loan Management Management

Recommended Strategy

Pre-lending

- Low Risk
- Medium Risk
- High Risk

Rules

Lending

- Low Risk
- Medium Risk

Credit Scoring (Model)
Loan Structuring Proposal

Post-lending

- Repayment Reminders
- Monitoring & Early Warning
- Debt Collection - NPL Management

Why bad loan?

Update

Insights

- Customers having bad loans tended to have shorter credit histories than the others
- Loans for customers in low grades (D to G) lead to higher risks
- The percentage of bad loans with long term is 3 times that of short term
- Borrowers with bad loans carry higher debt loads and repayment burdens
- While debt consolidation is the most common purpose, small business loans carry the highest risk

- Feature Importance:

Top influencer:
interest_rate is by far the most important feature (13%)

Moderate importance:
debt_to_income_ratio, installment_to_inc,
credit_history_length, annual_income,
sub_grade,
installment,
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Thank You