

# Optimizing Loan Interest Rates with Predictive Modeling: A Business Perspective

By Salvatore Bosco



# Introduction:



As a lending company, setting the right interest rates is crucial for success. But how do you determine the optimal interest rate that will ensure loan repayment while minimizing default risk and other costs? The answer lies in predictive modeling.





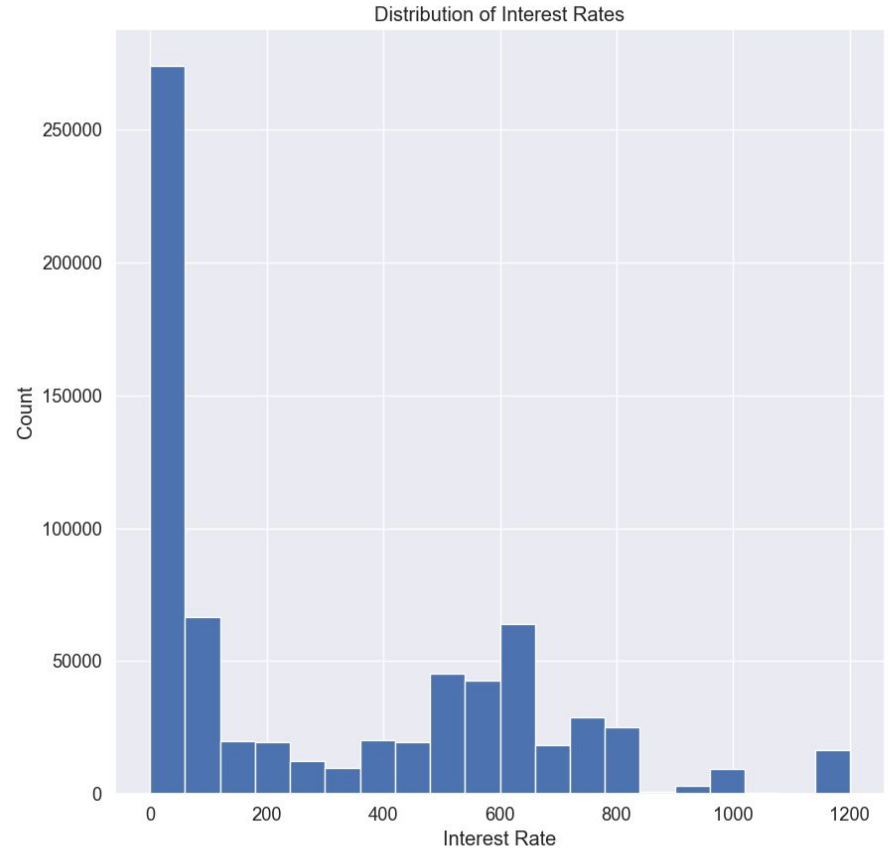
In this presentation, we will show you how our data science team can use predictive modeling to help countries and banks optimize loan interest rates and manage loan portfolios more effectively.

Our team will work with your loan data, including variables such as Original Principal Amount, Cancelled Amount, Undisbursed Amount, Disbursed Amount, Total Amount Disbursed, and Country. Our goal is to identify the factors that drive interest rates and gain insights into how they interact with each other. By analyzing these variables, we can determine the optimal interest rate for your loans.

# Loan Rates



The reason why most interest rates in this dataset are 0 is because the IBRD offers "soft loans" to developing countries that have a low or zero interest rate. These loans are designed to promote economic development in these countries by providing them with low-cost financing for infrastructure projects, such as roads, bridges, and power plants. The IBRD's soft loans are often subsidized by donor countries or by the IBRD itself, which allows it to offer very low interest rates or even zero interest rates to eligible borrowers.



## FSL (Financial Sector Loan) and POOL (Pooled Loan)

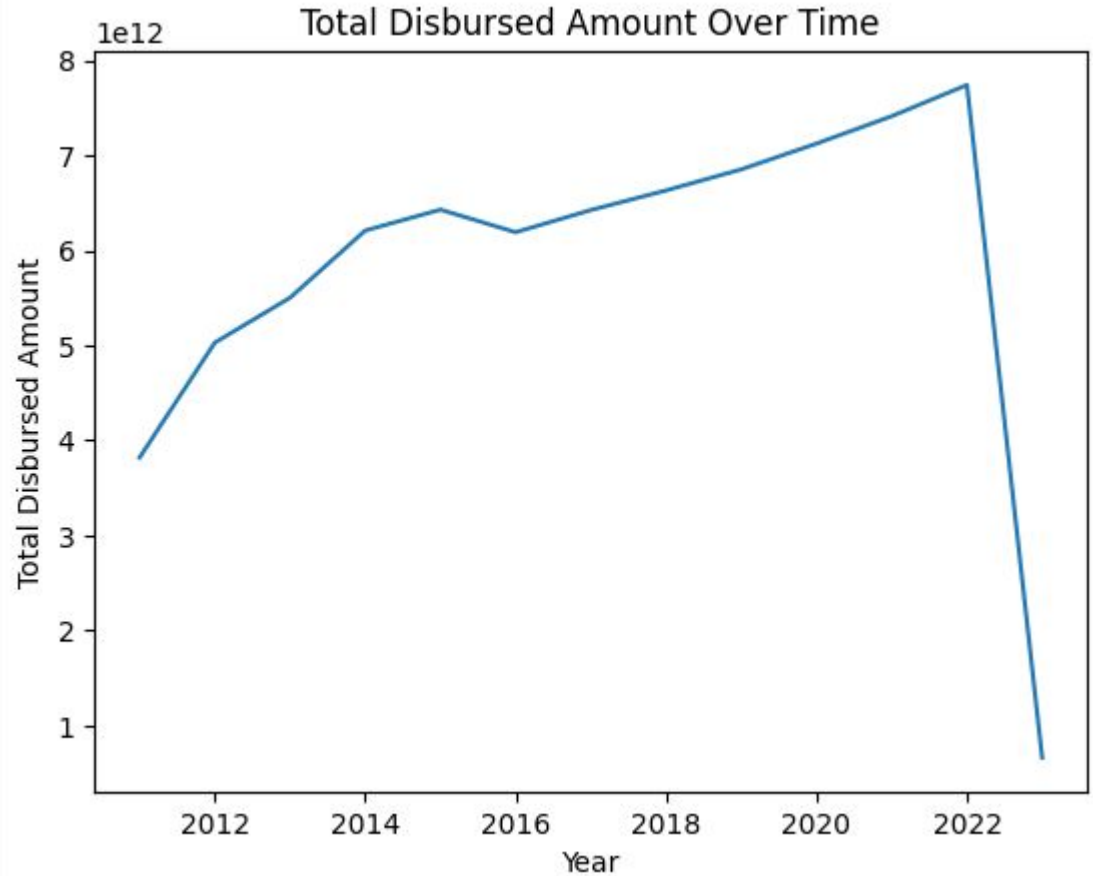
Targeted lending: FSL and POOL loans are targeted at specific areas of development, such as financial sector reforms and policy changes, which may be a priority for many developing countries. As a result, these types of loans may be in high demand from eligible borrowers, leading to a higher volume of loans of this type in the dataset.





# Covid Effects on Loans






Even after the pandemic, loans have ceased to come back with the IBRD.







# R2 Scores



Model	R2 Score
Linear Regression	0.923
Decision Tree	0.999
Gradient Boosting	0.914

# Ideal Interest Rates

Ideally countries are willing to give loans with a soft interest rate starting at 0%. If the country has proven difficult in the sense that they are misappropriating loans or may default, that interest will increase, or the loan denied. We can predict around 92% of the variance in the data set, and through our services will give you a loan rating.



# Loans from China

One of the main criticisms of China's lending practices in Africa is the lack of transparency and accountability in the loan agreements. China has been accused of providing loans with opaque terms and conditions, which can make it difficult for African governments to fully understand the financial risks and obligations involved. Additionally, China's loans are often tied to specific infrastructure projects, which may not always be in the best interests of the borrowing country and may not generate sufficient economic returns to repay the loans.



## Loans from China

0%



12%

CBD

CHEXIM

Bar Chart of Loan Amounts by Lender for China Loans

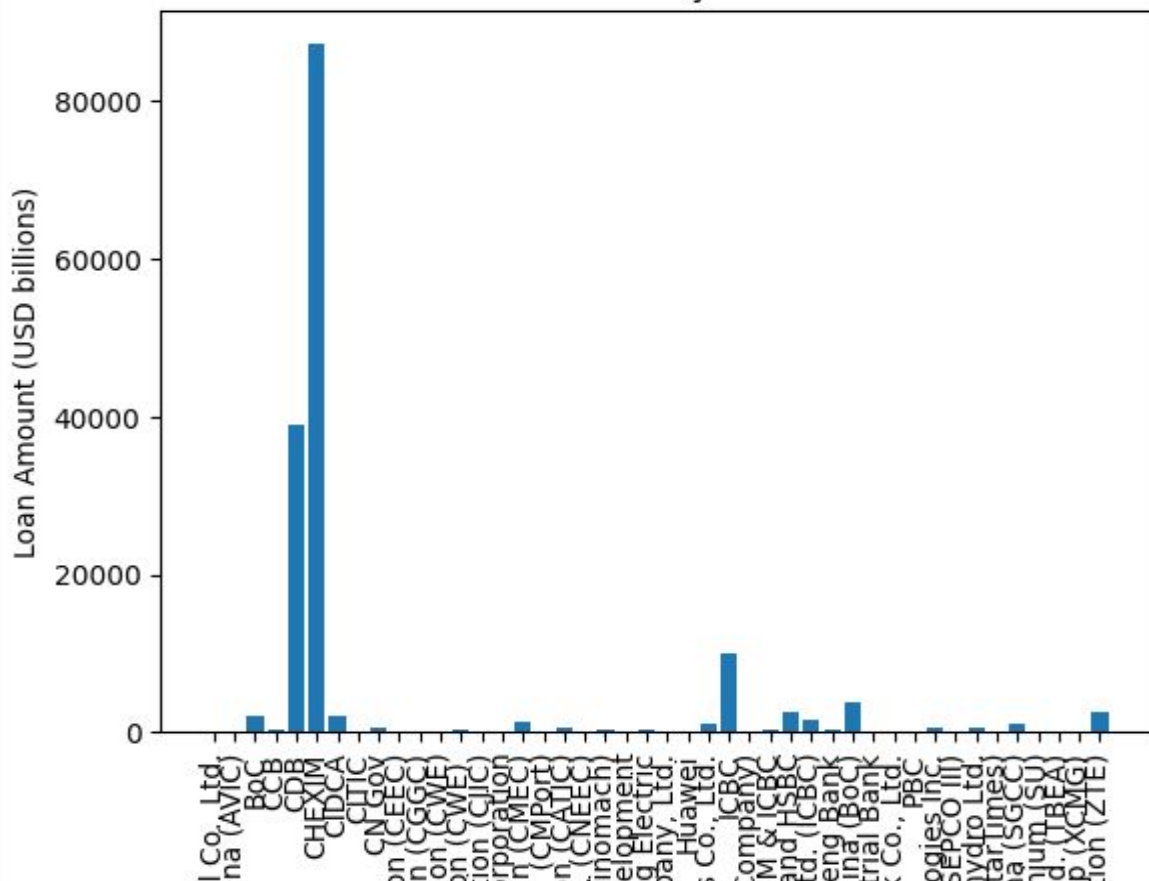
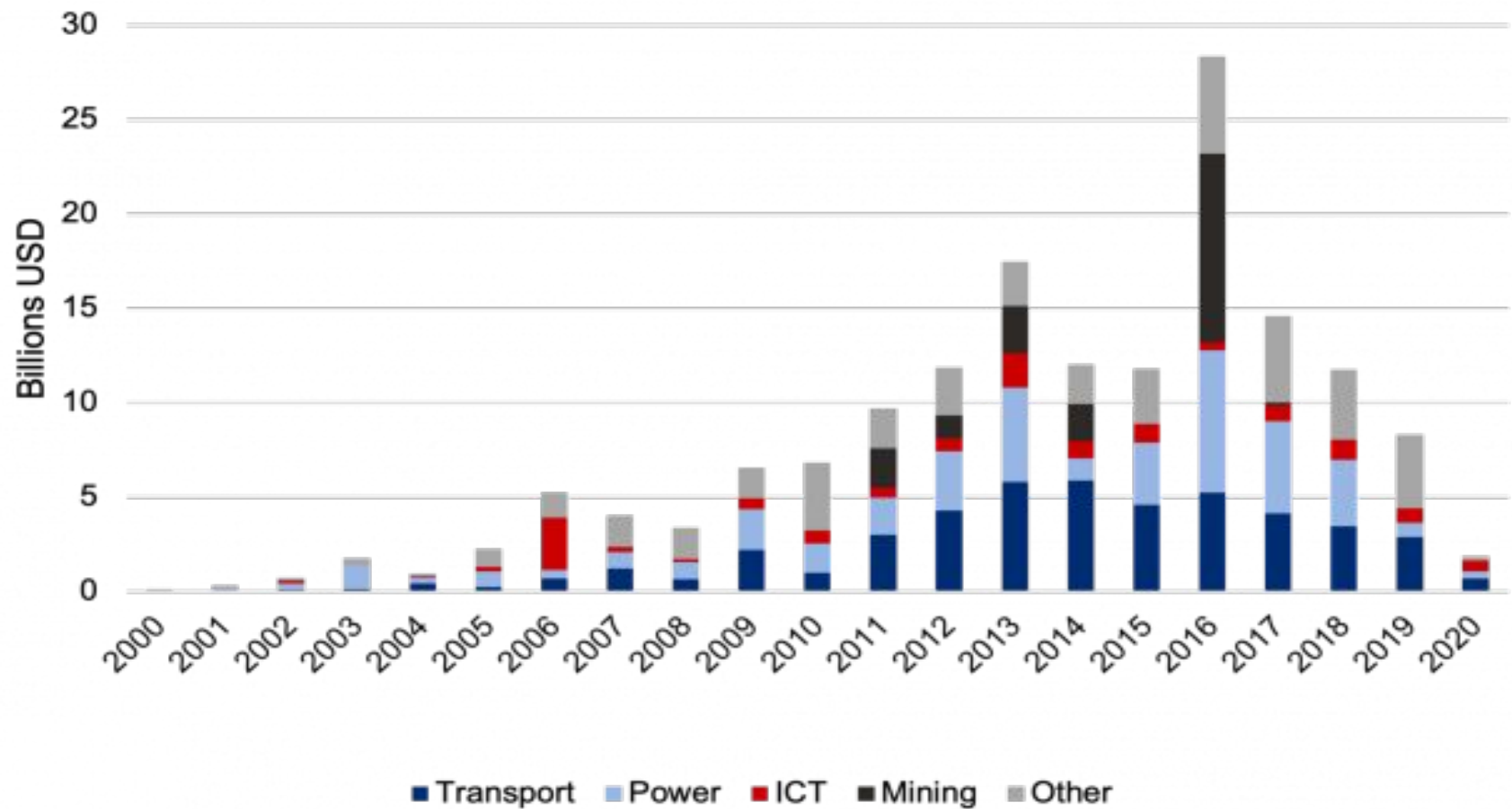


FIGURE 3

**Use of Confidentiality Clauses in Chinese Contracts Over Time**



**SOURCE:** Anna Gelpern, et al., "How China Lends: A Rare Look Into 100 Debt Contracts with Foreign Governments," Peterson Institute for International Economics, Kiel Institute for the World Economy, Center for Global Development, and AidData at William & Mary, March 31, 2021, 23, <https://www.aiddata.org/publications/how-china-lends>.





**Thank you!**