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## Project 2 – Milestone 2

### **Business Problem**

The primary business problem revolves around identifying potential "red flags" in the financial statements of banks that could indicate an impending failure. By analyzing historical data from banks that have previously failed, the goal is to unearth patterns or correlations that might serve as early warning signs. Addressing this problem could potentially aid regulatory bodies and investors in mitigating risks and preventing future crises.

### **Background/History**

Bank failures can result from a myriad of factors, including poor decision-making, economic downturns, or fraudulent activities. Historical data on banks that have failed and fallen into FDIC receivership provides a rich source of information to analyze financial trends and patterns preceding these failures. Understanding these patterns could provide insights into commonalities amongst failed banks, serving as potential indicators of instability.

### **Data Explanation**

The data utilized originates from banks that have previously failed, comprising financial variables like "Total Assets" and "Net Worth". During data preparation, several steps such as handling missing values, ensuring data consistency, and addressing outliers were undertaken to ensure the reliability of the analysis. The data provides a snapshot of various financial aspects of these banks, enabling the exploration of patterns and correlations within their financial trajectories.

### **Methods**

The analysis largely focused on exploratory data analysis (EDA), investigating distributions, correlations, and trends within key financial variables. Methods included visualizations like histograms, correlation matrices, and line plots to uncover insights into the financial behaviors and statuses of the failed banks. The goal was to identify patterns or “red flags” that might indicate financial distress or impending failure.

## **Analysis**

The analysis revealed various insights, such as high correlations between certain financial variables and the presence of outliers in key metrics, which might indicate financial distress. Specific financial variables exhibited patterns and extremes that, upon further validation and testing, could potentially serve as indicators or "red flags" of financial instability or impending failure within a banking institution.

## **Conclusion**

While the analysis unveiled potential "red flags" in the financial trajectories of failed banks, predicting bank failures is a complex and multifaceted challenge. The identified patterns and correlations provide a foundational understanding and should be approached with caution, ensuring rigorous testing and validation against additional data to ascertain reliability and minimize the risk of false positives. Ultimately, looking closely at a trajectory of assets and net value against outside market factors could be a valuable path moving forward.

## **Assumptions**

The analysis assumes that patterns and correlations identified within the historical data of failed banks can be indicative of potential future bank failures. It presupposes that the financial variables explored, and the identified "red flags" are significant contributors to bank failures, without being influenced by external, unobserved factors.

## **Limitations**

The primary limitation lies in the complexity of predicting bank failures, which can be influenced by numerous, often external, variables not captured in the available data. Furthermore, the absence of data on banks that did not fail limits the validation and testing of the identified "red flags", potentially affecting the reliability and applicability of the findings.

### **Challenges**

Challenges include managing the complexity and multifaceted nature of bank failures, ensuring accurate and reliable predictive indicators, and validating findings against additional data. The presence of outliers and extreme values, which may significantly influence analyses and predictions, also presents a substantial challenge to developing reliable predictive models.

### **Future Uses/Additional Applications**

Beyond predicting bank failures, the identified "red flags" and patterns could potentially be utilized in broader financial analyses, risk assessments, and regulatory contexts. They could inform investment strategies, assist in the development of regulatory policies, and provide a basis for further research into financial stability and crisis prevention within the banking sector.

### **Recommendations**

It is recommended to approach the application of identified "red flags" cautiously, ensuring rigorous testing and validation against additional data. Incorporating external data, such as macroeconomic variables, and applying more sophisticated predictive modeling techniques could enhance the reliability and applicability of the findings and should be considered in future analyses.

### **Implementation Plan**

A prudent implementation plan would involve further validating and testing the identified "red flags" against additional data, ideally from banks that did not fail. Subsequent steps would encompass developing a predictive model, incorporating external data to enhance predictive power, and collaborating

with domain experts to ensure practical applicability. Continuous monitoring, testing, and refinement of the model would be crucial to ensure ongoing reliability and relevance in predicting bank failures.

### **Ethical Assessment**

Primary ethical concerns using financial data at any time, especially for analysis of non-failed banks, is that findings presented could have a material impact on the market by creating fear or otherwise

### **References**

*Failed Banks Data with Balance Sheet.* (2023, May 15). Kaggle.

<https://www.kaggle.com/datasets/utkarshx27/failed-banks-database/data>