DATA 609: Project Proposal - A Simple Convex Optimization on Regulatory Financial Reporting

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All financial institutions are required to report their financial data in accordance with multiple regulatory frameworks such as Basel III and Dodd Frank Act. Due to the complexities with some of the framework, it can be challenging for some financial companies, particularly smaller regional or community banks, to maximize their returns while ensure that they are to be in regulatory compliance on limited resources and times. Because of that, it can cause potential reporting errors and may lead to financial institutions being penalized with fines of millions dollars and may have a significant impact on the financial market.

For this project, the purpose will be using convex optimization applications for a simple regulatory finanical reporting problem. Specifically, the optimal allocation of a bank's capital across different assets (cash, bonds, stocks, etc) will be determined in order to maximize returns while ensuring compliance with regulatory capital requirements.

While convex optimization is used for finance, it is only used for portfolio optimization and it has not been fully explored in terms of regulatory reporting perspectives. If this project is successful, it can serve as a starting point to explore and devlop deep learning or non-convex optimization applications.

This project is derived from the problem 3 of Lab 2 assignment and the approach from that assignment will be applied in this project. The approach will be using historical public financial data from various databases to ensure that there are no missing or inaccurate data since some financial data are not available to public. That could be a risk factor since inaccurate or missing data can impact the optimization. The constraint used for this project are regulatory requirements set by the frameworks.