

# MTFC Project Proposal 2024-25

Team Name	You Gompei For This
Team ID #	19714
Project Title	Marking the Market and Profiting from Prophecies: Using a Mathematical Model to Reduce the Risk of Stocks

## MTFC Project Proposal Template Use Notes:

- Refer to the official MTFC Project Proposal Prompts 2024-25 for the 15 prompts and scoring instructions.
- The use of this template is OPTIONAL.
  - It is provided as an optional resource for teams to keep their Project Proposal response organized. Teams who wish to use this template should make a copy in order to edit.
- The final version of the team's MTFC Project Proposal should be downloaded as a PDF or Word document to submit on the ICS Dashboard. A single file will be submitted.
- Additional resources (including the Actuarial Process Guide) can be found on the Modeling the Future Challenge website: <https://www.mtfchallenge.org/resources/>
- Please direct any questions to [challenge@mtfchallenge.org](mailto:challenge@mtfchallenge.org).

## Part 1: Project Definition (*Team's Topic*)

These prompts can be found on page 3 of the MTFC Project Proposal Prompts 2024-25. Additional information on Project Definition can be found in **Step 1: Project Definition** in the Actuarial Process Guide.

Team Responses:

### #1: Identify the topic

- Response: Trading stocks can be risky. The financial risk is very clear and apparent as different forms of trading stocks can allow for different amounts of risk. The goal is to mitigate this risk through three different strategies.

### #2: Identify potential risks

Response:

- Trading with insider knowledge can result in legal issues and legal fees. Even a large return on investment can result in legal action.
- There is also a large risk of loss when investing, as stock prices can vary.
- Addiction to trading, which can result in bankruptcy is also a major risk.

### #3: Identify a behavior change risk mitigation strategy

- Response: Stop people from spreading information to outside parties. Limit the amount of money spent on stocks. Not investing in risky stocks.

### #4: Identify a modifying outcomes risk mitigation strategy

- Response: Brokerage apps can limit the amount of money potential investors can invest into stocks based on their income, thereby reducing the risk of losing all your money in stocks. Hedging is another potential risk mitigation strategy for modifying outcomes.

### #5: Identify an insurance risk mitigation strategy

- Response: Insuring stocks or paying out dividends can curb the risk of loss.

### #6: Identify driving research questions for your topic

- Response:
  - Research Question #1: What potential strategies could we employ to allow traders to ensure that the risk of trading is lowered?
  - Research Question #2: How much money would a trader save by utilizing these risk mitigation strategies that we have outlined in the questions above (3, 4, 5)?

## Part 2: Data Identification & Assessment (*Team's Topic*)

These prompts can be found on page 4 of the MTFC Project Proposal Prompts 2024-25. Additional information on Data Identification and Assessment can be found in **Step 2: Data Identification & Assessment** in the Actuarial Process Guide.

Team Responses:

### #7: Identifying the type of data you hope to find

- Response: Since we are looking at stocks, we would like to have more time-relevant data (such as data from now, 5 years ago, 10 years ago, etc.) We would also like to be able to see how specific stocks changed over time (since we can then calculate the losses incurred by someone who put x amount of \$ into those stocks over a specific time period). Something else that could be important for our ideal dataset is how many times a specific stock had a noticeable crash and boom over a specific time period, but this may be a bit challenging to find.

### #8: Identify potential data sources for your topic

- Response:
  - There is an Excel function, "STOCKHISTORY", that could be used to make our own dataset. However, this would require a lot of work and would be more difficult to manage. At the same time, this function would allot us a lot more freedom with the data we want to use. With STOCKHISTORY, you can mainly look at the low/high and open/close for a stock over a daily/weekly/monthly time period. We can use this data to make predictions for futures of the stocks or also look at how stocks in the same general field perform compared to each other.
  - We could use Koyfin, Yahoo Finance, Stock analysis, and EDGAR as potential data sources.
  - <https://www.koyfin.com/>
    - Koyfin has a lot of data, such as how specific stocks performed over time (with graphs and percentages). These would be specifically helpful for us, since we could look again at how stocks that are in the same general field perform and how stocks have risen and fallen over time.
  - A few more potential data sources we could use are listed below.
  - <https://finance.yahoo.com/>
  - <https://stockanalysis.com/>
  - <https://www.sec.gov/search-filings>

## Part 3: Mathematical Modeling (*Team's Topic*)

These prompts can be found on page 5 of the MTFC Project Proposal Prompts 2024-25. Additional information on Mathematical Modeling can be found in **Step 3: Mathematical Modeling** in the Actuarial Process Guide.

Team Responses:

### #9: Modeling research on your topic

- Response: There are models that predict highs and lows of stock prices over a given period of time. Models can take the mean of a stock, take the measure of dispersion, or take the median. Models can take the moving average (short term OR long term). Models that use measure of dispersion or range measure the homogeneity and heterogeneity of the stock price from the average. This allows models to predict how much a stock price can vary, allowing insurance companies to set a premium based on the stocks invested in or for the investor to see the risk involved in a stock.

### #10: Goals of a mathematical model in the project phase

- Response: Minimize the risk of loss. This can be achieved by allowing investors to use the model to predict stock crashes.

### #11: Assumption development

Response:

- A stock's past performance is indicative of its future performance.
- There will be no market movers.
- The data we have about some stock investors is representative of the entire population of investors.

## Part 4: Risk Analysis (*Team's Topic*)

These prompts can be found on page 6 of the MTFC Project Proposal Prompts 2024-25. Additional information on conducting a Risk Analysis can be found in **Step 4: Risk Analysis** in the Actuarial Process Guide.

Team Responses:

### #12: Goals for mitigation strategy

- Response: If no interventions are made, we would expect the current volatility and number of stocks to rise, especially with the boom in cryptocurrency, which is known to be quite volatile. Therefore, it is expected that the loss incurred by stockholders will also continue to rise over time. Hence, our goal for our risk mitigation strategy is to reduce this loss by diversifying the money stockholders can use to invest, and to insure stocks so that stockholders are at much less risk of losing their money.

## Part 5: Recommendations (*Team's Topic*)

These prompts can be found on page 7 of the MTFC Project Proposal Prompts 2024-25. Additional information on making Recommendations can be found in **Step 5: Recommendations** in the Actuarial Process Guide.

Team Responses:

### #13: Recommendation differences between mitigation strategies

- Response: Some metrics that we are considering are:
  - The average and total values of loss/gain for stockholders if these mitigation strategies were incorporated
  - The average and total values of loss/gain for Fortune 500 companies if these mitigation strategies were incorporated
  - How much time it would take for this strategy to be incorporated
  - From a more qualitative point of view, how difficult it would be to make a grand change in the stock market by using this new mitigation strategy

### #14: Audience for recommendations

- Response: The audience for our recommendations will be the brokerage apps as well as the stockholders themselves. It makes sense to target the stockholders, since they are the main people (other than the company itself) at loss if there is a sudden crash in a specific stock.

### #15: Goals for situation improvement

- Response: Our recommendations would hope to
  - 1. Greatly reduce the risk of loss that stockholders face if they do not diversify their portfolios
  - 2. Help provide proper recommendations for stockholders into how they should diversify their portfolios (i.e. which stocks have low risk/high reward, how their money should be split so as to not lose a great sum of money at once, etc.)
  - 3. Help brokerage apps by increasing the stock volumes of stockholders because they would not be scared to invest into stocks with diversification and risk mitigation.