Do Macroeconomic Indicators

Help Predict Stock Market Trend?

AGENDA

Business Problem **01**

02 Literature Research

Data Preprocessing **03**

04 Prediction Models

Conclusions **05**
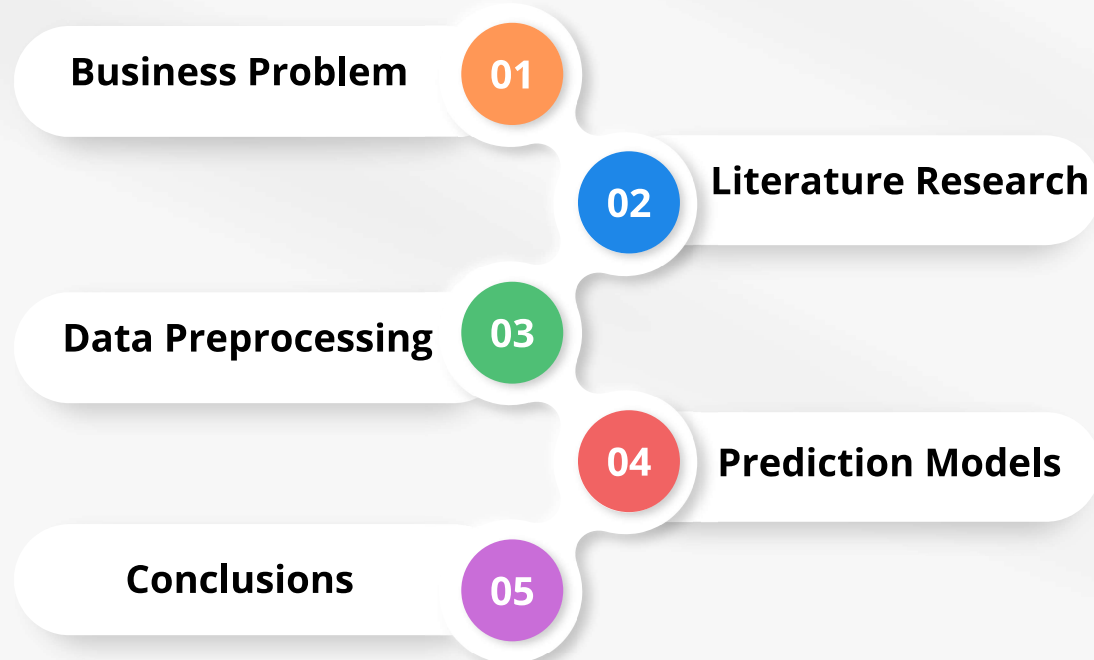
Business Problem

☑ To find the most influential economic indicators affecting S&P 500 stock index performance.

☑ To use these factors to build a model that predicts the future growth of S&P 500 stock index.

☑ To check if this model could predict stock market crashes.

Literature Research

Godfrey (1964)

Stock price prediction is considered impossible according to the random walk hypothesis, which states the stock market prices moves just like a random walk

Malkiel (1973)

If the market is truly efficient and a share price reflects all factors immediately as soon as they're made public, a blindfolded monkey throwing darts at a newspaper stock listing should do as well as any investment professional.
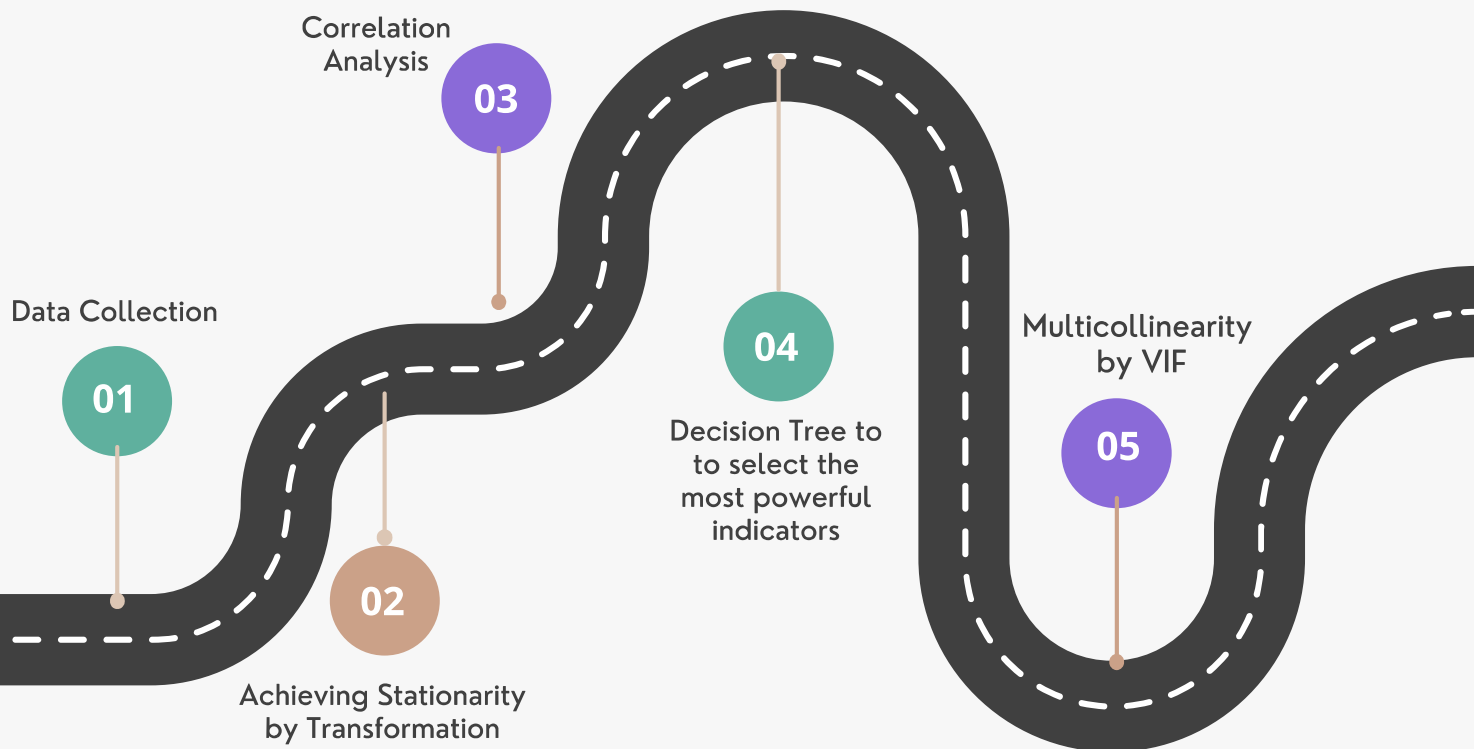
Pilinkus (2010)

The relation between macroeconomic indicators and stock prices is confirmed in the most academic works, although there is a lack of comprehensive assessment of causality.

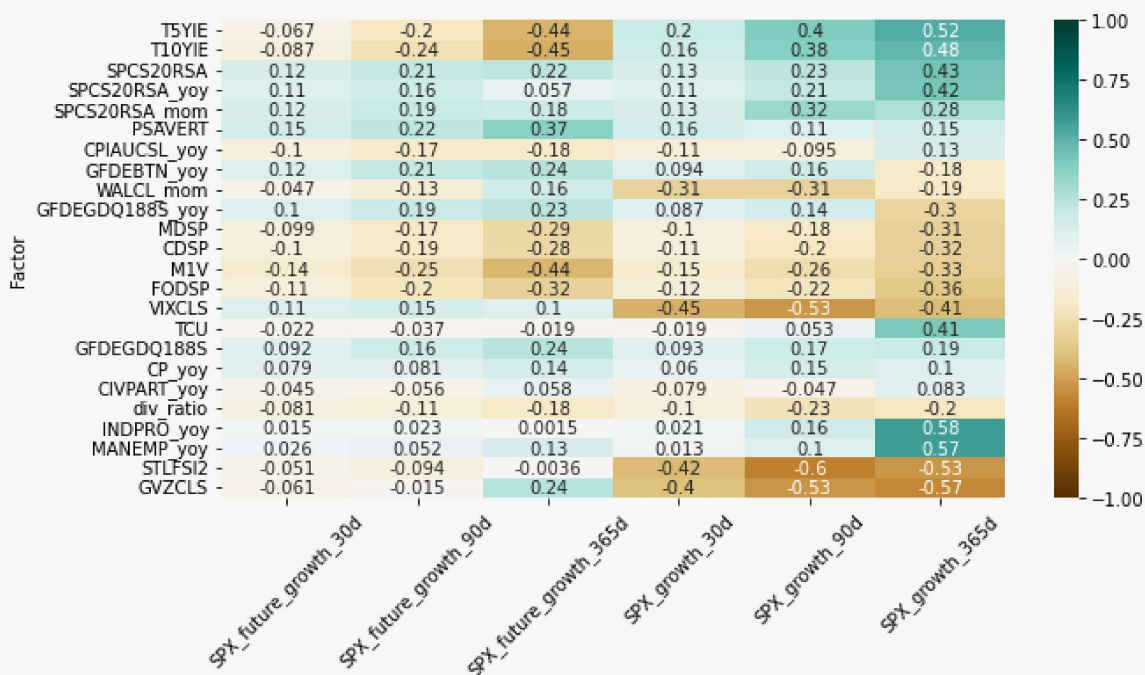## Prazak's (2018)

General Macro - economic indicators provide a statistically significant impact on stock prices in the long run.

Data Preprocessing

Data Collection

01

Achieving Stationarity by Transformation

02

Correlation Analysis

03

Decision Tree to to select the most powerful indicators

04

Multicollinearity by VIF

05

Correlation Matrix

Factor	SPX_future_growth_30d	SPX_future_growth_90d	SPX_future_growth_365d	SPX_growth_30d	SPX_growth_90d	SPX_growth_365d
T5YIE	-0.067	-0.2	-0.44	0.2	0.4	0.52
T10YIE	-0.087	-0.24	-0.45	0.16	0.38	0.48
SPCS20RSA	0.12	0.21	0.22	0.13	0.23	0.43
SPCS20RSA_yoy	0.11	0.16	0.057	0.11	0.21	0.42
SPCS20RSA_mom	0.12	0.19	0.18	0.13	0.32	0.28
PSAVERT	0.15	0.22	0.37	0.16	0.11	0.15
CPIAUCSL_yoy	-0.1	-0.17	-0.18	-0.11	-0.095	0.13
GFDEBTN_yoy	0.12	0.21	0.24	0.094	0.16	-0.18
WALCL_mom	-0.047	-0.13	0.16	-0.31	-0.31	-0.19
GFDEGDQ188S_yoy	0.1	0.19	0.23	0.087	0.14	-0.3
MDSP	-0.099	-0.17	-0.29	-0.1	-0.18	-0.31
CDSP	-0.1	-0.19	-0.28	-0.11	-0.2	-0.32
M1V	-0.14	-0.25	-0.44	-0.15	-0.26	-0.33
FODSP	-0.11	-0.2	-0.32	-0.12	-0.22	-0.36
VIXCLS	0.11	0.15	0.1	-0.45	-0.53	-0.41
TCU	-0.022	-0.037	-0.019	-0.019	0.053	0.41
GFDEGDQ188S	0.092	0.16	0.24	0.093	0.17	0.19
CP_yoy	0.079	0.081	0.14	0.06	0.15	0.1
CIVPART_yoy	-0.045	-0.056	0.058	-0.079	-0.047	0.083
div_ratio	-0.081	-0.11	-0.18	-0.1	-0.23	-0.2
INDPRO_yoy	0.015	0.023	0.0015	0.021	0.16	0.58
MANEMP_yoy	0.026	0.052	0.13	0.013	0.1	0.57
STLFSI2	-0.051	-0.094	-0.0036	-0.42	-0.6	-0.53
GVZCLS	-0.061	-0.015	0.24	-0.4	-0.53	-0.57

Correlation Analysis

☑ The general level of correlations between the macro factors and the stock market goes down when we try to predict growth for the latter period.

☑ The macro inputs dont have an immediate impact, their influence grows over time.

The Most Powerful Indicators

Money Supply
- Velocity of M1 Money Stock

Prices and Inflation
- 5-Year/10-Year Breakeven Inflation Rate
- Consumer Price Index
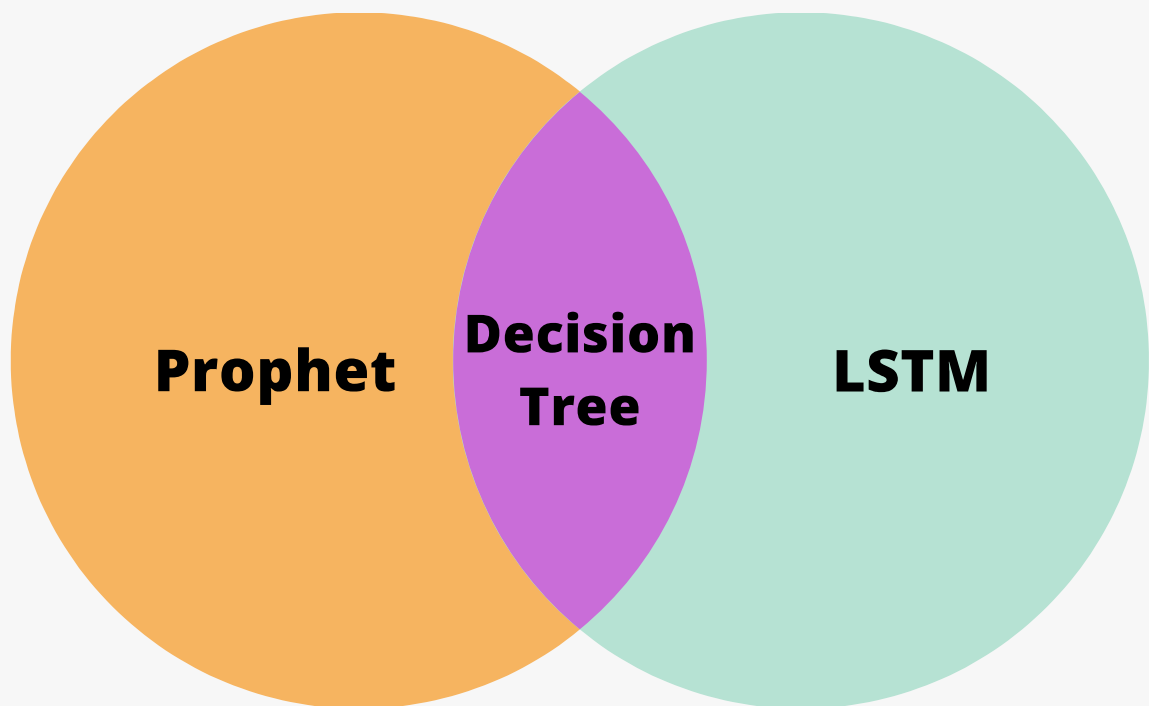
Gov-t debt
+ Federal Debt as Percent of Gross Domestic Product

Income and Expenditure
+ Personal Saving Rate
+ Household Financial Obligations

Others
+ Composite Home Price Index
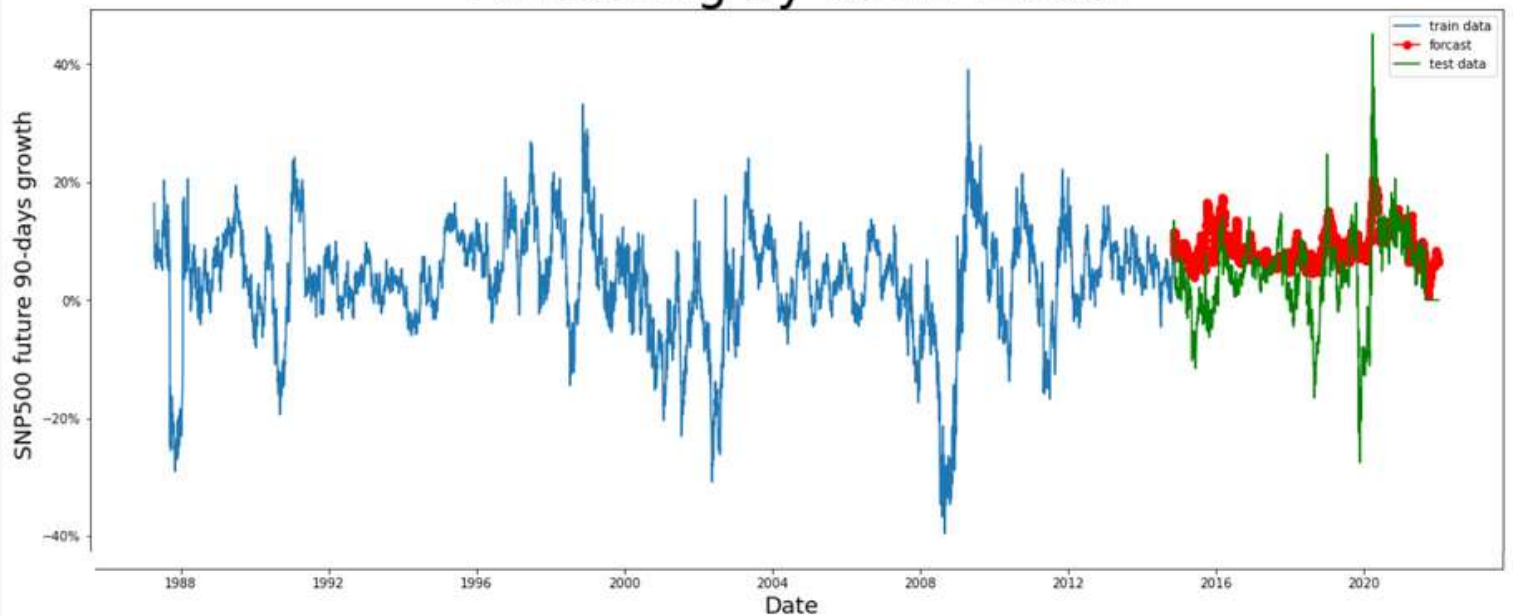- CBOE Volatility Index
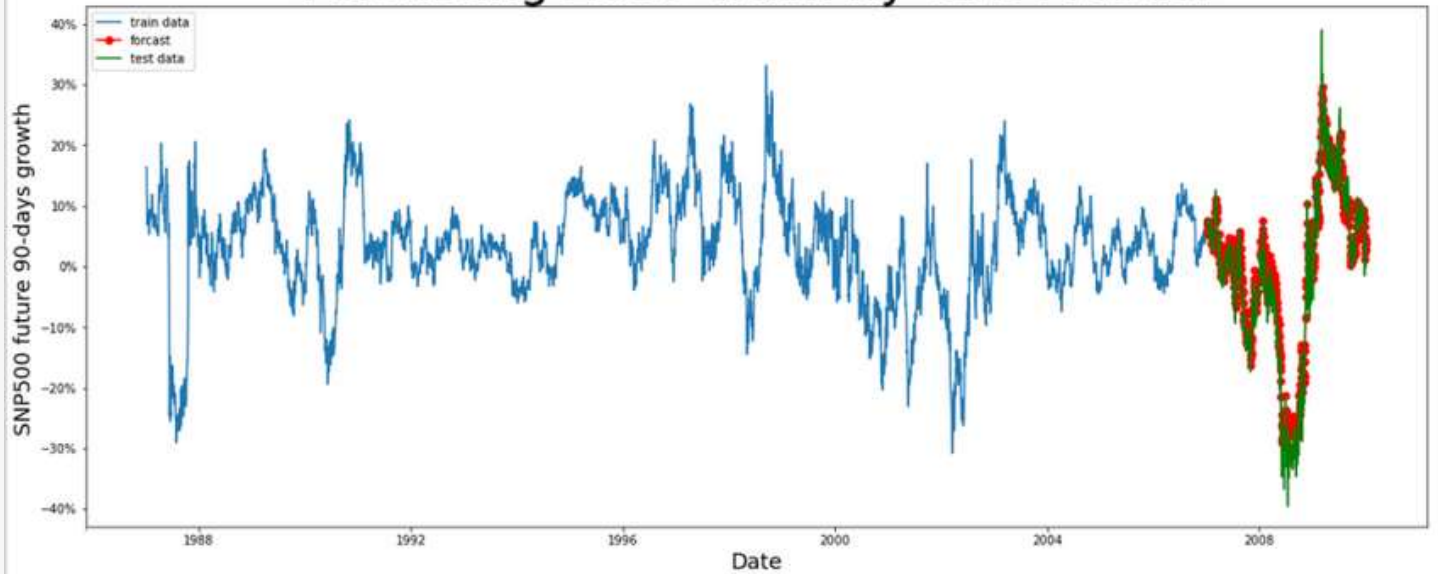- Dividend Ratio

Prediction Models

Prophet

Decision Tree

LSTM

Forcasting by Prophet Model
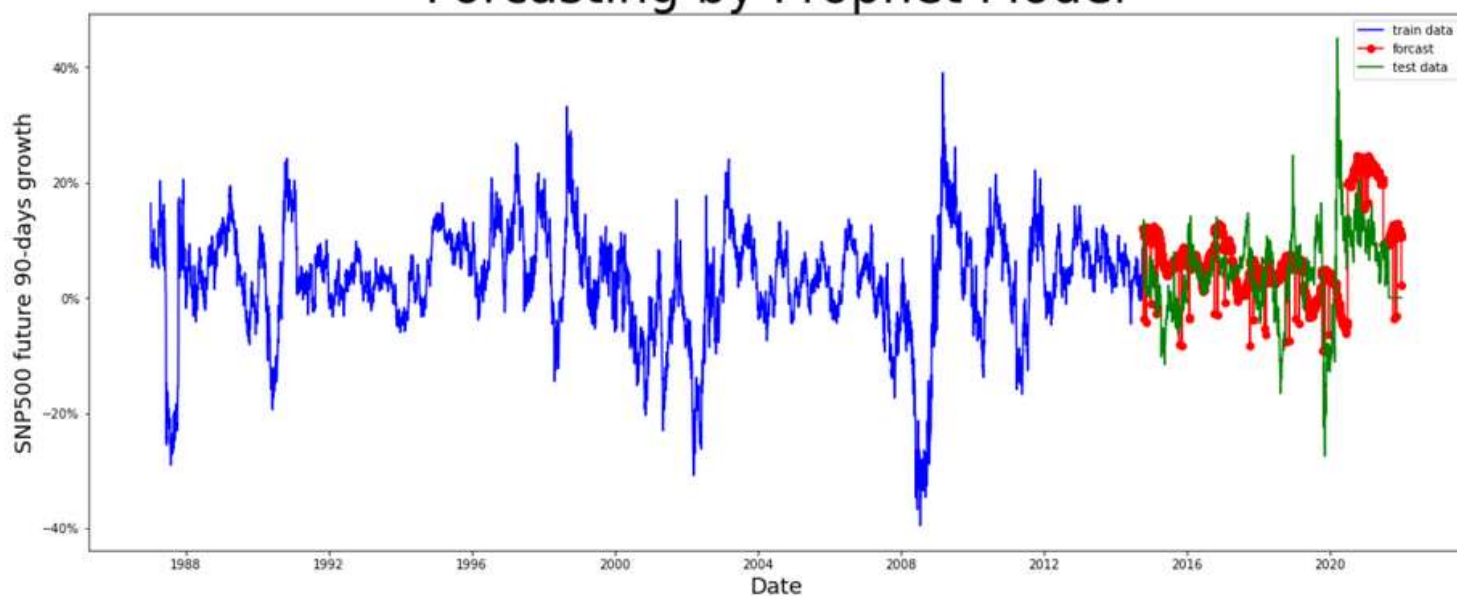
Forcasting by LSTM Model

Forcasting 2008 crash by LSTM Model

Models Metrics

MODEL/METRIC	MAE	MSE	RMSE
LSTM	5%	0.046%	6.8%
PROPHET	7.8%	0.1%	9.8%

Conclusions

✓ Stock markets are chaotic and volatile in the short term, therefore its hard to predict

✓ This analytics project identify 10 indicators that can have the most significant impact on stock markets. These factors help to build a prediction model that is statistically reliable.