S&P 500 VS Shanghai Composite Index

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4th to present

AGENDA

OUTLINE

Problem Statement & Introduction

Methodology and Process

Dataset

OUTLINE

BI

Application Slack

Q&A

INTRODUCTION AND PROBLEM STATEMENT

TITLE: Comparative Analysis of Stock Market Volatility: S&P 500 vs. Shanghai Composite During Economic Downturns

The S & P 500 and the Shanghai Composite are two of the major global stock. The S&P 500, representing the U.S. market, and the Shanghai Composite, representing China's market, often show different volatility patterns due to varying economic conditions, policies, and investor behavior in their respective regions. We aim to identify and compare the volatility levels in both indices during economic downturns, analyzing key features like sharp price drops, recovery times, and overall market behavior. By exploring these differences, we aim to gain insights into how each market reacts under financial stress and which factors contribute to these fluctuations.

S & P 500 / Shanghai Composite Index

The S&P 500 and the Shanghai Composite Index are two of the largest stock market indices in the world.

The S&P 500, is a stock market index that measures the stock performance of 500 of the largest publicly traded companies in the United States. It is widely regarded as one of the best representations of the U.S. economy and is a key benchmark for investors.

The Shanghai Composite Index is a stock market index that tracks all stocks listed on the Shanghai Stock Exchange, encompassing both A-shares and B-shares. It serves as a crucial indicator of China's economic health and investor sentiment, reflecting the performance of one of the world's largest emerging markets.

We will analyze the volatility of the S&P 500 and Shanghai Composite Index during economic downturns to understand their respective responses to financial crises. By comparing these we aim to uncover insights that can guide investors in navigating market fluctuations and making informed decisions during periods of economic instability.

STANDARD &POOR'S 500

SSE SHANGHAI STOCK EXCHANGE

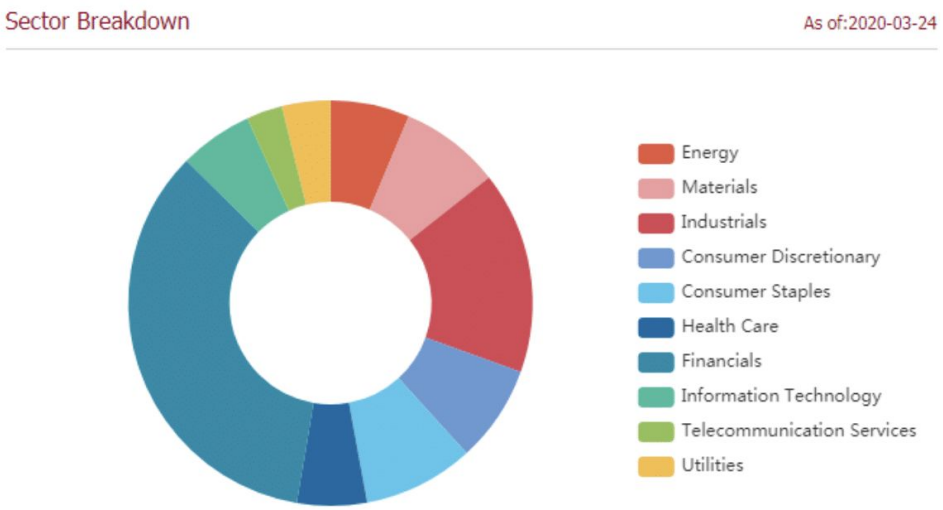
Introduction

Background/ Context :

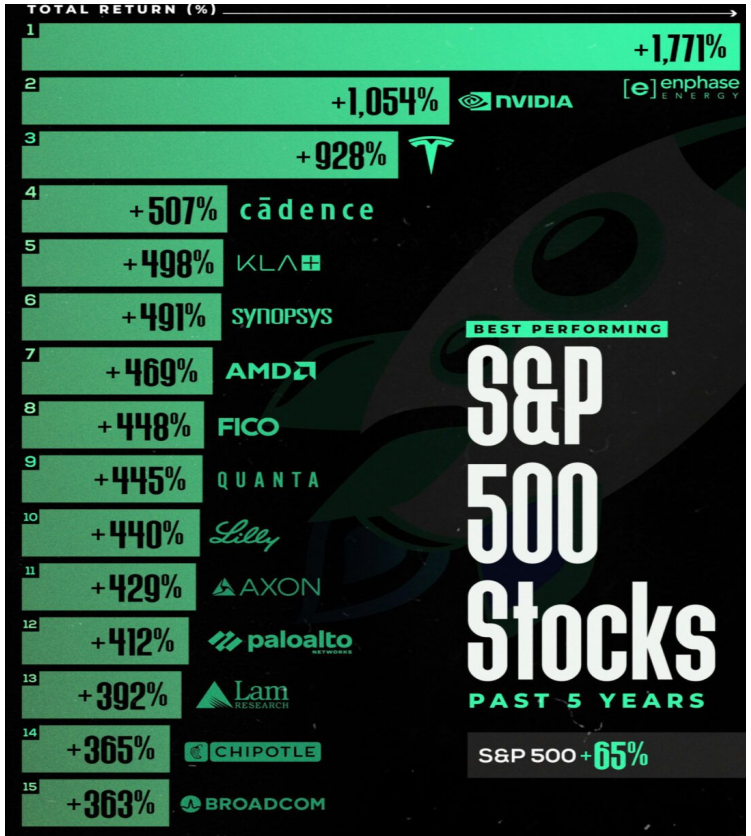
By analysing of stock market volatility we can understand market dynamics, especially during economic downturns how investors behavior and market stability are significantly impacted. With the S&P 500 and Shanghai Composite Index being two of the largest and most influential stock indices globally, their performance can reflect broader economic trends in the U.S. and China, respectively. This will utilizes a comprehensive data collection approach, using yfinance API to gather historical data on these indices, which will be organized and cleaned for accurate analysis. By using Python libraries for data visualization and statistical modeling, we aim to present a clear comparison of volatility trends, enabling a deeper understanding of how these markets react to economic challenges. This analysis not only contributes to academic research but also provides valuable insights for investors seeking to navigate turbulent market conditions.

Problems you want to find answers

After analyzing the data we can address several questions regarding stock market volatility during economic downturns. Specifically, we aim to compare the volatility levels of the S&P 500 and Shanghai Composite Index to understand how they differ during periods of economic crisis. We will analyze specific patterns of price fluctuations in both indices and explore their correlation with broader economic indicators. Additionally, we will investigate the speed of recovery for each index after downturns, examining the factors that influence these recovery trajectories. Furthermore, we will identify which economic events or conditions have the most significant impact on the volatility of each index and compare these effects between the two markets. Finally, we will utilize statistical models to gain predictive insights into future volatility trends, aiding investors in making informed decisions during potential downturns.



Source China Securities Index



METHOD AND PROCESS

METHODOLOGY

- Data collection:
  - Data will be collected using yahoo finance with the yfinance api. We will also gather data based on timeframes where there are high interest rates or unemployment or global events like covid-19
- Data Storage:
  - Data will be stored using Sql for efficient querying and analysis. This will allow for efficient data cleaning by using Sql and Python's pandas.
- Volatility Measurement:
  - Volatility will be conducted by using statistical measures like standard deviation over certain time frames to show how volatility changes throughout the economic downturns

Process

Exploratory Data Analysis

- We will use python libraries like seaborn and matplotlib to visualize the volatility trends during a downturn period.

Comparative analysis:

- The volatility of both the S&P500 and the Shanghai composite index wil be plotted side by side by using line charts, box plots and standard deviation plots
- With the plots and data we can calculate if the S&P and Shanghai composite index have similar or different market behavior.

Results and Tools used:

With our Results we aim to identify patterns between the two indices during downturns and economic/global events. We will use python and Sql for data extraction and cleaning and Tableau to present our findings in a organized way.

DATASET

DATA COLLECTION

The data Collection will primarily be through APIs

- For historical market data on the S&P 500 and the Shanghai Composite Index we will use:
  - Yahoo Finance API
  - Alpha Vantage API
- For other relevant economic data such as GDP growth rates, inflation rates, and interest rates:
  - Federal Reserve Economic Data (FRED)
  - World Bank Database
  - National Bureau of Statistic of China

DATA CLEANING

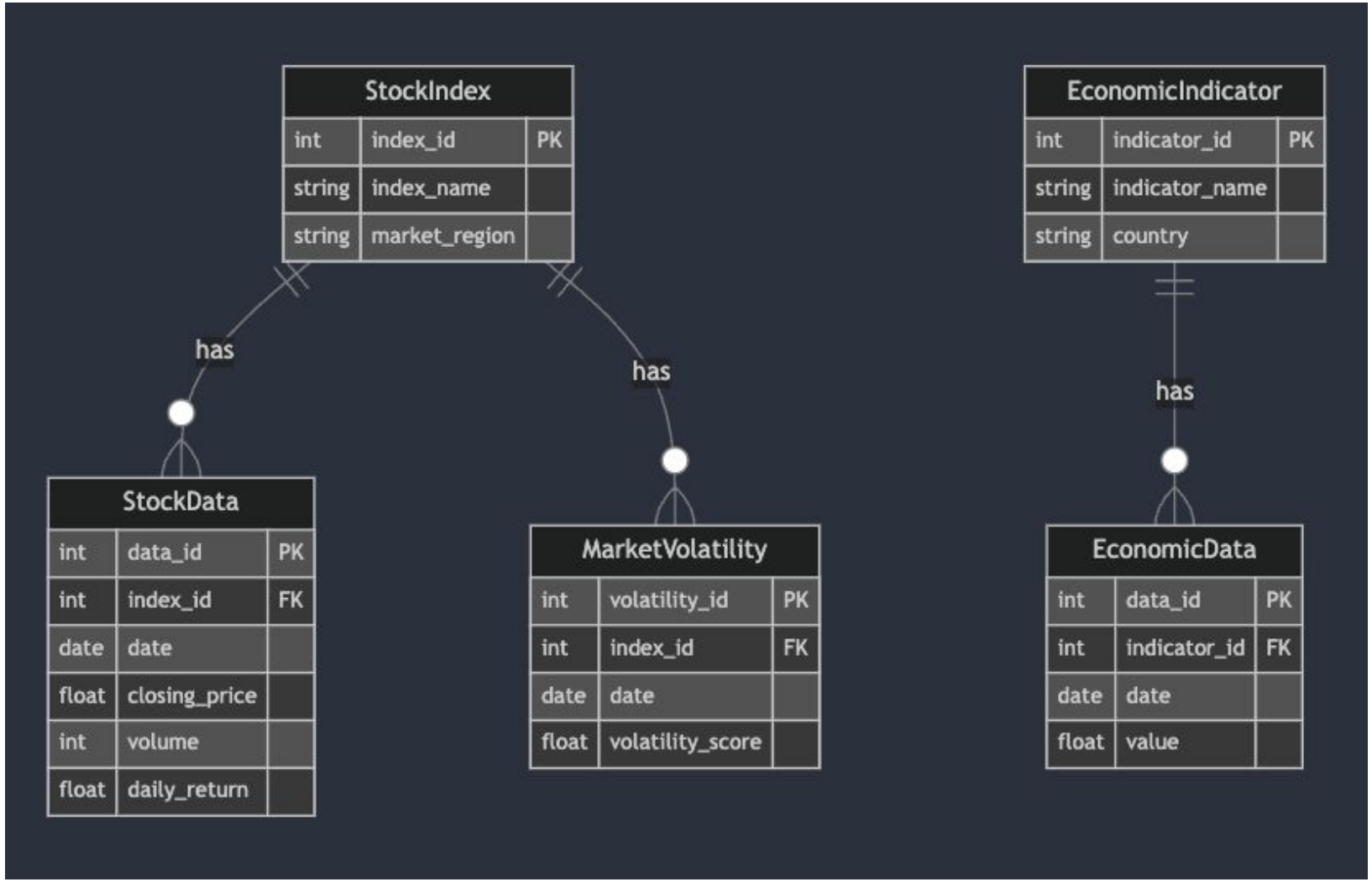
Data Cleaning and Preprocessing

- The API responses will be in json format, we will parse the data using **.json()** in python. Then transformed into structured format using **pandas.json_normalize()** for easier analysis.
- We will fill missing values using forward fill or interpolation to ensure continuity in the data.
- Data standardization will be performed to align the date formats and unify time series data across multiple sources.
- The objective is to collect and clean data to be used for comparative analysis of S&P 500 and the Shanghai Composite Index.

ER Diagram for S&P 500 and SCI Analysis

- **This ER Diagram shows the entities:**
  - StockIndex
  - StockData
  - MarketVolatility
  - EconomicIndicator
  - EconomicData
- **It also shows the following relations:**

1. **StockIndex to StockData** - captures daily data points for each stock index.
2. **StockIndex to MarketVolatility** - Links each index to its calculated volatility score.
3. **EconomicIndicator to EconomicData** - Shows time series data for different indicators across different dates.



BUSINESS INTELLIGENCE

Business Intelligence Dashboard

- Display historical price trends for both indices, making it easy to see which has performed better
- Use Side-By-Side charts in order to easily compare things such as, average yearly return, bigger ups and downs, and the speed of recovery after dips
- Compare the volatility by using line charts to show the fluctuation of both indices
- Display stats such as average returns, highest points, lowest points and overall growth

APPLICATION STACK

Back End

Languages and Modules

- Python
  - Pandas
  - NumPy
  - Seaborn/Matplotlib

BI Tool

- Tableau

Database Management System

- MySQL

MEMBER ROLES

Data Collection and Extraction

- Sohail Ahmad
- Priti Saha

BI Management

- Jeffrey Umanzor

EDA

- Joquanna Scott

Predictive Analysis

- Kenneth Romero
- Aquib Zaman

Q&A