

OUTLINE

01 - EXECUTIVE SUMMARY

05 - RESULTS

02 - PROJECT TIMELINE

06 - DISCUSSION

03 - INTRODUCTION

07 - CONCLUSION

04 - METHODOLOGY



EXECUTIVE SUMMARY

Overview:

This project aims to provide a comprehensive analysis of the United Kingdom's economic openness and its foreign trade relations from 2000 to 2022. Utilizing a combination of Python for data cleaning and preprocessing and Tableau for visualization, this project offers insights into key economic indicators and trade dynamics.

Objectives:

- Evaluate Economic Openness: Measure the UK's economic openness through the foreign trade quota (trade-to-GDP ratio).
- Analyze Trade Relationships: Identify and visualize the UK's top trade partners for imports and exports over the specified period.
- Assess Economic Performance: Examine key economic indicators such as GDP, GDP per capita, GNI, and GNI per capita to understand the economic performance and living standards.

EXECUTIVE SUMMARY

Key Findings:

1. Trade Performance:

- The USA, Germany, and the Netherlands are consistently top trading partners, indicating strong and stable trade relationships.
- Significant fluctuations in trade values, especially during global events such as the financial crisis of 2008 and the COVID-19 pandemic.

2. Economic Openness:

- The foreign trade quota reveals the UK's degree of integration into the global economy.
- Trends indicate periods of increased economic openness and phases of reduced trade activities due to external shocks.

3. Economic Indicators:

- Analysis of GDP, GDP per capita, GNI, and GNI per capita shows overall economic growth with occasional downturns.
- The data highlights the impact of global events on the UK's economic performance and living standards.

PROJECT TIMELINE

Data Cleaning and Preparation

Remove unnecessary columns and rows, handle missing values, check data types, and convert data to a more readable version (e.g., round numbers, convert to billions). This step ensures that the dataset is clean and ready for analysis, minimizing errors and inconsistencies.

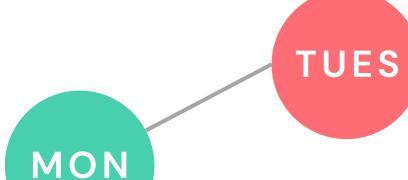
Exploratory Data Analysis

Visualize data for a better understanding of the dataset. Use various plots and charts to uncover patterns, trends, and relationships within the data. This step helps in forming hypotheses and directing further analysis.

Presentation

Create the final presentation with the results of the analysis. Summarize the key findings, insights, and visualizations into a coherent narrative that effectively communicates the project's outcomes and implications

MON



WED

THURS

FRI

Data Collection

Collect necessary data from two open sources: World Bank Open Data and ITC Trade Map. These sources provide comprehensive and reliable datasets that include key economic indicators and trade values needed for the analysis.

Descriptive Analysis

Get summary statistics and check for outliers to understand the basic features of the data. This includes measures like mean, median, standard deviation, and identifying any anomalies or outliers that may need further investigation or handling.

Visualization

Use clean data in Tableau to create interactive visualizations that provide a comprehensive understanding of the UK's economic growth and trade relationships. These visualizations enable users to interact with the data, explore different aspects, and gain insights through a visual interface.

PROJECT INTRODUCTION A

The United Kingdom, as one of the world's largest economies, plays a significant role in global trade. Understanding the dynamics of its economic openness and trade relationships is crucial for policymakers, economists, businesses, and educators. This project aims to provide a comprehensive analysis of the UK's economic performance and its foreign trade relations from 2000 to 2022.

Objectives:

• Evaluate Economic Openness:

Measure the UK's economic openness using the foreign trade quota (trade-to-GDP ratio), which indicates the extent to which the country is integrated into the global economy.

• Analyze Trade Relationships:

o Identify and visualize the UK's top trade partners for imports and exports over the specified period, highlighting key trade relationships and changes over time.

• Assess Economic Performance:

• Examine key economic indicators such as GDP, GDP per capita, GNI, and GNI per capita to understand the UK's economic growth, development, and living standards.

PROJECT INTRODUCTION

Importance:

Understanding the UK's economic openness and trade relations is vital for several reasons:

- Policy Formulation: Helps policymakers develop informed strategies to enhance economic growth and trade relationships.
- Business Strategy: Assists businesses in identifying market opportunities, understanding trade barriers, and making strategic decisions.
- Economic Education: Provides educators and students with a detailed understanding of international trade and economic dynamics.
- Global Trade Insights: Contributes to a broader understanding of global trade patterns and the UK's role in the international economy.

METHODOLOGY

DATA COLLECTION

DATA CLEANING AND PREPARATION

DESCRIPTIVE ANALYSIS

EXPLORATORY DATA ANALYSIS (EDA)

Sources: Data was collected from two primary open sources:

- World Bank Open Data: Provided comprehensive economic indicators, including GDP, GDP per capita, GNI, and GNI per capita.
- ITC Trade Map: Offered detailed trade data for the UK, including import and export values with various trade partners over the specified period.
- Remove Unnecessary Columns and Rows: Unneeded columns and rows were removed to streamline the dataset using Python.
- Handle Missing Values: Missing values were identified and appropriately handled using Python to ensure data completeness.
- Check Data Types: Data types were checked and corrected using Python to ensure consistency and accuracy.
- Convert Data to Readable Format: Data was rounded and converted to billions where applicable using Python to enhance readability and interpretability.
- Summary Statistics: Generated summary statistics, including mean, median, and standard deviation, to provide a basic understanding of the data.
- Outlier Detection: Identified and examined outliers to address any anomalies that could skew the analysis.
- Data Visualization: Various plots and charts were created to explore the data, uncover patterns, and identify trends and relationships.
- Insight Generation: EDA helped in forming hypotheses and directing further analysis by providing a visual understanding of the dataset.

METHODOLOGY

VISUALIZATION

PRESENTATION

- Tableau Visualizations: Used the cleaned data to create interactive visualizations in Tableau, including:
 - Trade Partners Map: Showcased the UK's top import and export partners over the years.
 - Economic Indicators Charts: Displayed trends in GDP, GDP per capita, GNI, and GNI per capita.
 - Foreign Trade Quota Analysis: Illustrated the trade-to-GDP ratio to measure economic openness.
- Interactive Features: Enabled users to interact with the visualizations, such as selecting specific years and exploring different aspects of the data.

- Final Presentation: Compiled the results of the analysis into a comprehensive presentation.
- Key Findings and Insights: Highlighted the main findings and insights from the analysis.
- Narrative Structure: Presented the information in a coherent and logical narrative, making it easy for stakeholders to understand and interpret the results.

RESULTS

GITHUB: DATA ANALYSIS

TABLEAU: VISUALIZATION

DATA CLEANING AND PREPARATION

ISSUE / PROBLEM

To perform a comprehensive analysis of the United Kingdom's economic openness and trade relations from 2000 to 2022, the raw data needed to be cleaned and prepared for exploratory data analysis. The initial dataset contained unnecessary columns and rows, missing values, and inconsistencies in data types.

RESPONSE

The data team undertook a detailed data cleaning and preparation process using Python to ensure the dataset was accurate, consistent, and ready for analysis. This involved removing unnecessary columns and rows, handling missing values, verifying and correcting data types, and converting data into a more readable format.

UNDERSTANDING THE DATA

After reviewing the dataset, several key steps were identified and executed to prepare the data for analysis:

- Remove Unnecessary Columns and Rows: Columns and rows that did not contribute to the analysis were removed to streamline the dataset.
- Handle Missing Values: Missing values were identified and handled appropriately to maintain data completeness.

```
missing_gni_per_capita_growth = df[df['GNI per capita growth (annual %)'].isna()]
missing_gni_per_capita_growth
```

```
missing_value = df.loc[22, 'GNI per capita growth (annual %)']
df.replace (missing_value, new_gni_per_capita_growth_2022, inplace = True)
```

- Check Data Types: Data types were checked and corrected to ensure consistency and accuracy.
- Convert Data to Readable Format: Data values were rounded and converted to billions where applicable to enhance readability and interpretability.

```
for col in columns_to_round:
    df[col] = df[col].round(2)
```

• Calculate Foreign Trade Quota: The foreign trade quota, which measures the openness of the economy, was calculated using the formula:

```
df['Foreign Trade Quota (%)'] = (
    (df['Exports of goods and services (current US$) (in billions)'] +
    df['Imports of goods and services (current US$) (in billions)']) /
df['GDP (current US$) (in billions)']) * 100
```

IMPACT

A clean and well-prepared dataset allows for accurate and reliable analysis, which in turn leads to meaningful insights and conclusions about the UK's economic and trade dynamics.

KEY INSIGHTS

- Streamlined Dataset
- Complete and Accurate Data
- Consistent Data Types
- Improved Readability
- Economic Openness Measurement

DESCRIPTIVE STATISTICS

	GDP (current US\$) (in billions)	GDP growth (annual %)	GDP per capita (current US\$)	GDP per capita growth (annual %)	Exports of goods and services (% of GDP)	Exports of goods and services (annual % growth)	Exports of goods and services (current US\$) (in billions)	Imports of goods and services (% of GDP)	Imports of goods and services (annual % growth)	Imports of goods and services (current US\$) (in billions)	GNI (current US\$) (in billions)	GNI growth (annual %)	GNI per capita growth (annual %)	GNI per capita, Atlas method (current US\$)	Foreign Trade Quota (%)
count	23.000000	23.000000	23.000000	23.000000	23.000000	23.000000	23.000000	23.000000	23.000000	23.000000	23.000000	23.00000	23.000000	23.000000	23.000000
mean	2605.029130	1.720435	41082.695652	1.139565	28.253913	3.012174	742.978696	29.776957	3.575217	782.204783	2590.544348	1.78000	1.190435	41088.260870	58.029565
std	439.350701	3.447576	5959.224756	3.516748	2.724359	5.399450	170.694300	2.559301	6.113429	174.328332	426.230404	4.09714	4.011477	5865.278147	5.236270
min	1649.830000	-10.360000	27906.570000	-10.690000	24.060000	-11.470000	421.480000	26.180000	-16.000000	447.390000	1658.730000	-12.18000	-12.220000	29110.000000	50.240000
25%	2453.505000	1.575000	39907.985000	0.940000	25.605000	0.960000	645.655000	27.430000	2.585000	687.815000	2464.020000	1.04000	0.440000	39925.000000	52.890000
50%	2697.810000	2.240000	42109.640000	1.440000	28.580000	2.890000	801.030000	29.400000	3.980000	848.430000	2674.930000	2.11000	1.820000	42700.000000	58.770000
75%	2899.625000	2.700000	44738.425000	2.110000	30.455000	6.660000	839.810000	31.660000	6.445000	873.460000	2856.315000	3.13500	2.775000	44480.000000	62.115000
max	3141.510000	8.670000	50397.690000	8.760000	33.430000	12.720000	1032.610000	36.090000	14.610000	1114.980000	3158.740000	11.65000	11.280000	49240.000000	69.520000

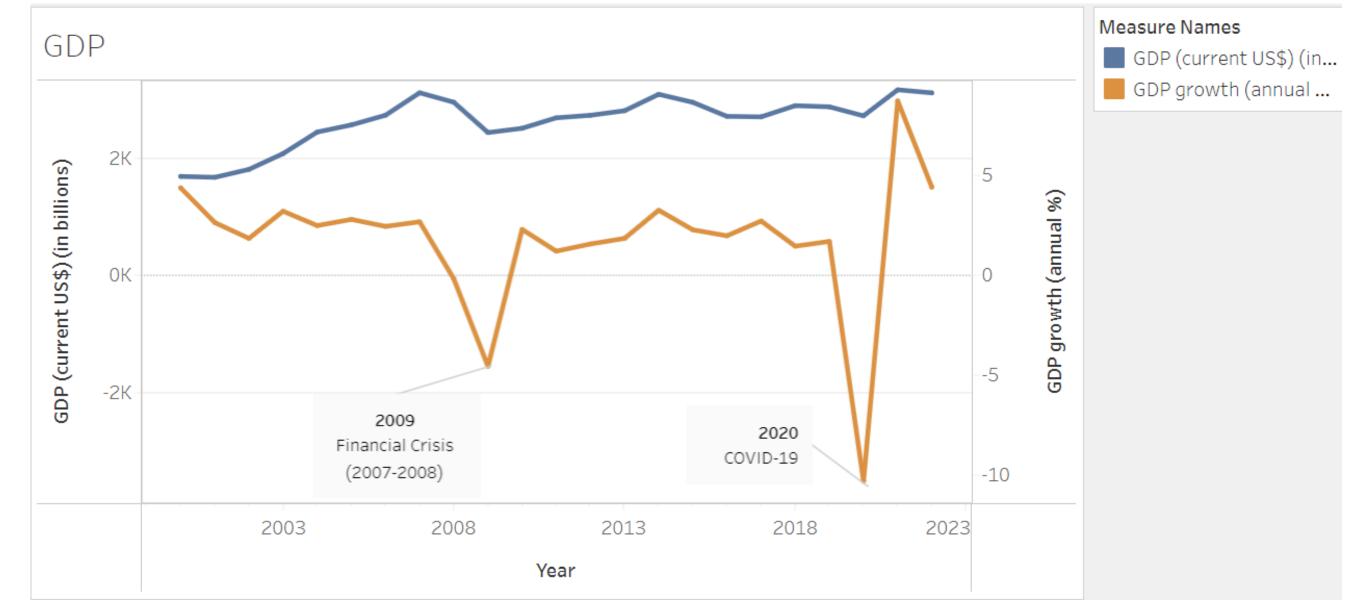


The descriptive statistics highlight the UK's economic strengths and vulnerabilities over the 22-year period. While the economy has shown significant growth in GDP, GNI, and trade values, there have also been periods of notable volatility, reflecting the impact of global economic events and domestic economic policies. The foreign trade quota emphasizes the UK's strong engagement in international trade, which is crucial for its economic health and development.

GROSS DOMESTIC PRODUCT

Gross Domestic Product (GDP) is a key economic indicator that represents the total market value of all goods and services produced within a country over a specific period, usually annually or quarterly. It serves as a comprehensive measure of a country's overall economic activity and health.

We observe a steady GDP growth from 2000 to 2007. In 2008, there is a decline that continues into 2009, linked to the financial crisis of 2008. From 2009 to 2014, GDP starts to rise again. Between 2014 and 2017, there is another decline. In 2018, GDP increases, but it falls again in 2019. This decline can be attributed to several factors such as Brexit uncertainty, a global economic slowdown, and domestic political uncertainty. In 2020 we see the most significant decline in the UK's GDP in history caused by COVID-19 pandemic.



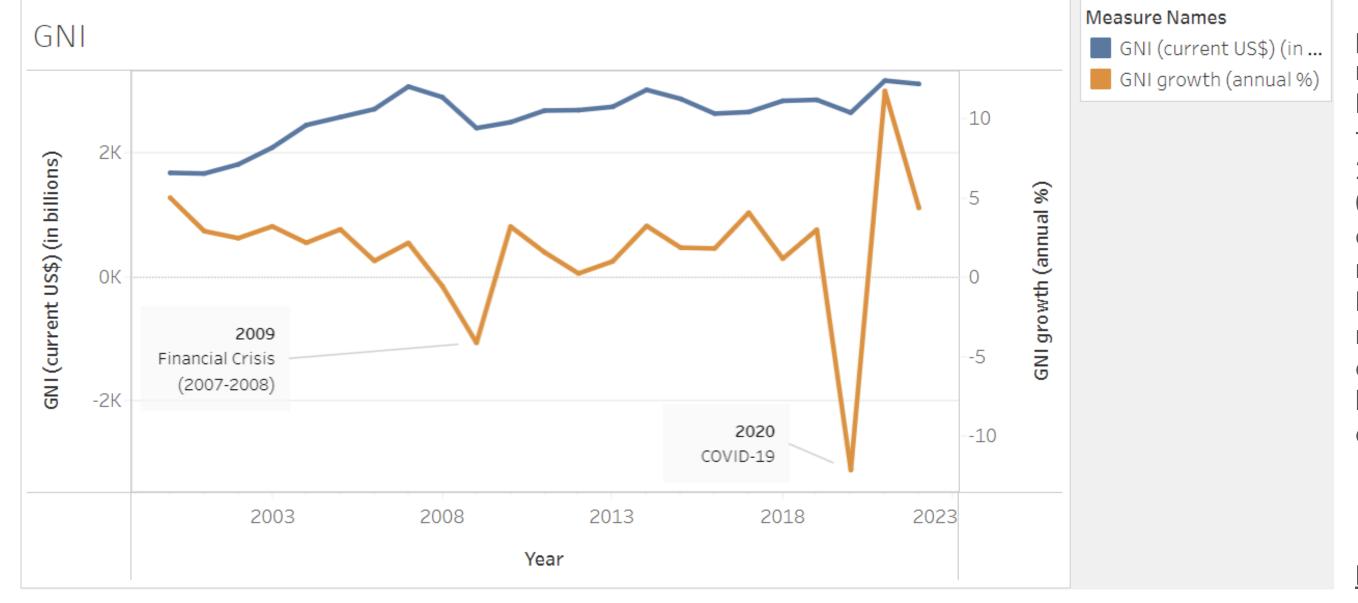
Based on the line chart, it's clear that the UK's GDP experienced various fluctuations over the years. The sharp drop in 2020 is particularly notable, illustrating the severe impact of the mentioned factors. Additionally, the recovery seen in 2021 indicates resilience and the potential for economic rebound following significant disruptions such as Covid-19.

Plot 1. UK's GDP 2000-2022

GROSS NATIONAL INCOME

Gross National Income (GNI) is an economic metric that measures the total income earned by a country's residents and businesses, regardless of whether the income is generated domestically or abroad. It includes the sum of a nation's gross domestic product (GDP) plus net income received from overseas.

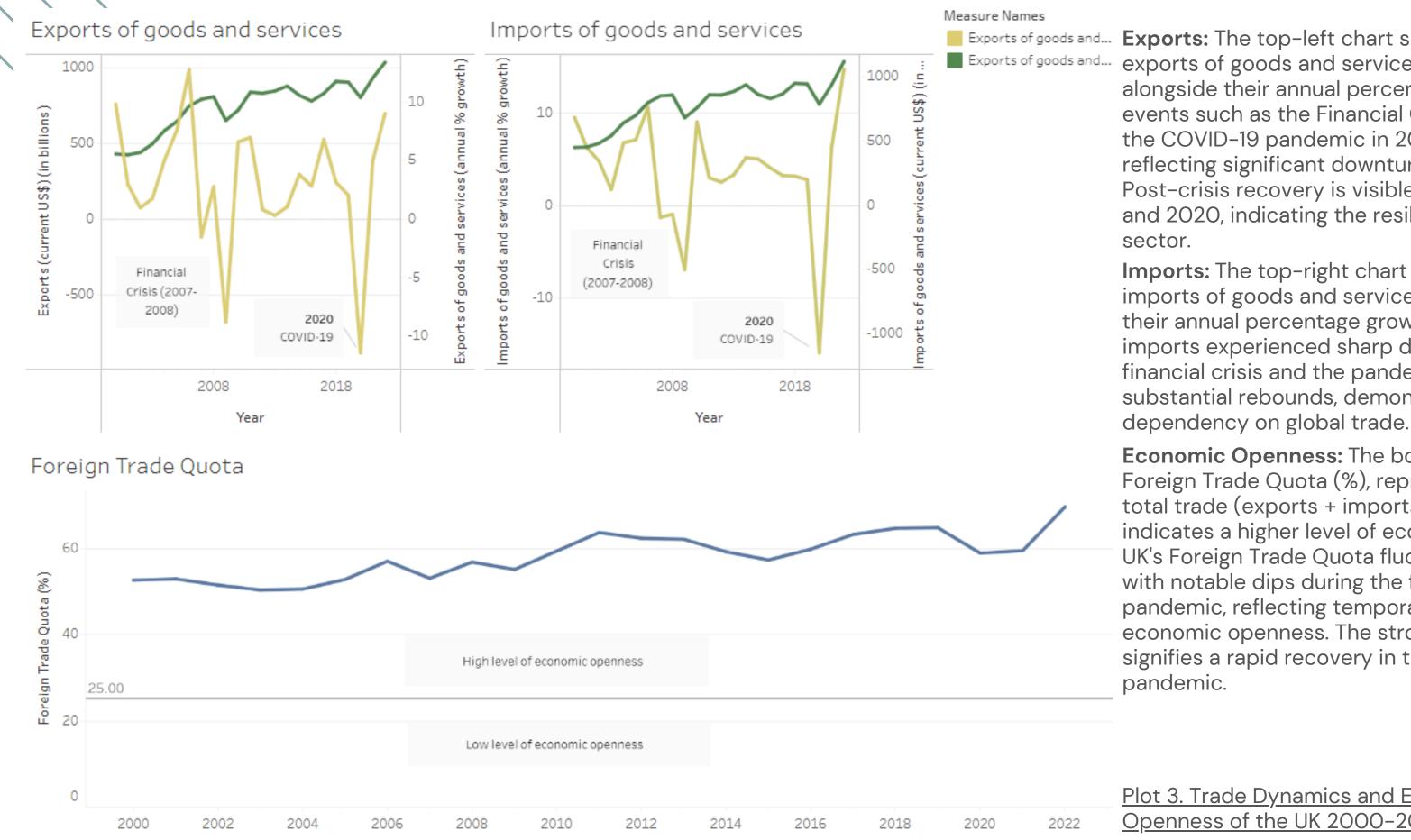
From 2000 to 2007, the UK's Gross National Income (GNI) showed steady growth, indicating a period of economic stability and consistent expansion. However, the global financial crisis of 2008–2009 led to a sharp decline in GNI, with growth rates dropping significantly into negative territory, reflecting the recession's severe impact. Following the crisis, the period from 2009 to 2014 marked a gradual recovery, with GNI increasing and growth rates showing positive but fluctuating values. However, 2019–2020 faced a significant decline due to factors like Brexit uncertainty, a global economic slowdown and the COVID–19 pandemic.



The UK's GNI has experienced periods of growth, decline, and recovery over the past two decades. Major downturns are associated with the global financial crisis (2008–2009) and the COVID-19 pandemic (2020). Recovery periods are evident post-crisis, with significant rebounds in GNI and growth rates. Fluctuations in GNI growth rates reflect the various economic challenges and uncertainties faced by the UK, including Brexit and global economic conditions.

Plot 2. UK's GNI 2000-2022

TRADE DYNAMICS AND ECONOMIC OPENNESS



Exports of goods and... Exports: The top-left chart shows the trends in the exports of goods and services (in billions of US\$) alongside their annual percentage growth. Notable events such as the Financial Crisis of 2007-2008 and the COVID-19 pandemic in 2020 are highlighted, reflecting significant downturns during these periods. Post-crisis recovery is visible, particularly after 2009 and 2020, indicating the resilience of the UK's export

> Imports: The top-right chart mirrors the trends in imports of goods and services (in billions of US\$) with their annual percentage growth. Similar to exports, imports experienced sharp declines during the financial crisis and the pandemic, followed by substantial rebounds, demonstrating the UK's

> Economic Openness: The bottom chart illustrates the Foreign Trade Quota (%), representing the ratio of total trade (exports + imports) to GDP. A higher quota indicates a higher level of economic openness. The UK's Foreign Trade Quota fluctuates around 50-60%, with notable dips during the financial crisis and the pandemic, reflecting temporary reductions in economic openness. The strong rebound in 2021 signifies a rapid recovery in trade activities post-

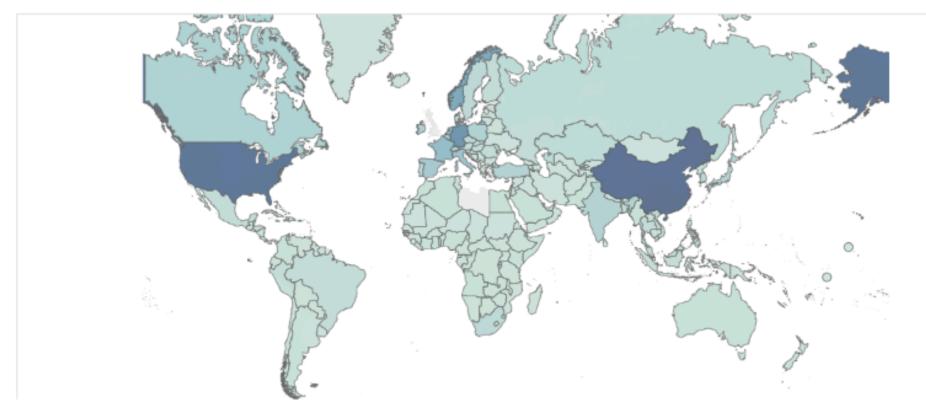
Plot 3. Trade Dynamics and Economic Openness of the UK 2000-2022

TRADE PARTNERS MAP

Export Trade Partners Map - 2022



Import Trade Partners Map - 2022



Importers

- (AII)
- ✓ Afghanistan
- ✓ Africa not elsew...
- ✓ Albania
- ✓ Algeria
- ✓ Andorra
- ✓ Angola

✓ Anguilla

Value (current US \$)

0	73,528,705
Year	

2022

4	Ļ	2022 ▼										7				
																0

Show history

Exporters

- (AII)
- ✓ Afghanistan
- ✓ Africa not elsew...
- ✓ Albania
- ✓ Algeria
- ✓ Andorra
- ✓ Angola ✓ Anguilla

Value (current US \$)



Export Trade Partners Map - 2022

- Top Export Destinations: The map shows that the United States is the largest export destination for the UK, followed by significant exports to European countries such as Germany and the Netherlands. This indicates the strong trade ties the UK maintains with both North America and Europe.
- Regional Distribution: The UK exports to a diverse range of countries across different continents, including significant trade volumes with countries in Asia, such as China and Japan.

Import Trade Partners Map - 2022

- Top Import Sources: The map highlights that China is the largest source of imports for the UK, followed closely by the United States and Germany. This reflects the UK's reliance on these major economies for a variety of goods and services.
- Wide Reach: Similar to exports, the UK imports goods from a broad spectrum of countries, indicating a well-integrated global trade network.

The maps provide a clear visual representation of the UK's trade relationships, showing a robust network of import and export partners spread across the globe. The United States, China, and Germany emerge as key trade partners, underscoring their significant roles in the UK's trade dynamics. The interactive features allow users to explore trade data for specific countries and years, offering detailed insights into the UK's international trade landscape.

Plot 4. UK Trade Partners Map 2000-2022



Key Questions and Areas for Further Analysis

Categories of Goods and Services:

- What categories of goods and services are most frequently imported and exported by the UK?
 - Understanding the specific categories of goods and services that dominate UK trade can help identify key industries and sectors driving economic activity.
- Which categories of goods and services are becoming more popular over time?
 - Analyzing trends in the popularity of different categories can reveal shifting trade patterns and emerging opportunities in the global market.

Economic Predictions:

- What are the potential future trends for the UK's economy based on current data?
 - can help policymakers and businesses prepare for future scenarios.
- How will global events, such as geopolitical changes or technological advancements, impact the UK's trade relations and economic growth?
 - Assessing the potential impacts of external factors can aid in developing strategies to mitigate risks and capitalize on opportunities.

Economic Resilience and Vulnerability:

- What factors contribute to the resilience or vulnerability of the UK's economy during global crises, such as the 2008 financial crisis and the COVID-19 pandemic?
 - Identifying key factors that influence economic stability can inform strategies to enhance resilience in future crises.
- How can the UK diversify its trade partners to reduce dependency on a few key countries?
 - Exploring diversification strategies can help mitigate risks associated with over-reliance on specific trade partners.

Impact of Trade Policies:

- How do changes in trade policies, such as tariffs and trade agreements, affect the UK's import and export activities?
 - Evaluating the effects of trade policies can provide insights into how to optimize trade agreements to benefit the UK economy.
- What are the implications of Brexit on the UK's trade dynamics with EU and non-EU countries?
 - A detailed analysis of post-Brexit trade patterns can help understand the long-term effects on the UK's economic relationships.







CONCLUSION The analysis of the United Kingdom's economic openness and foreign trade relations from 2000 to 2022 provides valuable insights into the country's economic performance and global trade dynamics. Overall, this project underscores the UK's robust economic

framework and its critical role in global trade, providing a

foundation for informed decision-making and strategic planning.

CONCLUSION

Economic Growth and Stability:

- The UK's GDP and GNI exhibited steady growth from 2000 to 2007, reflecting a period of economic stability.
- The financial crisis of 2008– 2009 and the COVID–19 pandemic in 2020 caused significant economic contractions, but the UK demonstrated resilience with subsequent recoveries.

• Trade Relationships:

- The UK maintains strong trade relationships with major economies such as the United States, Germany, China, and the Netherlands.
- The Foreign Trade Quota highlights the importance of international trade to the UK, with periods of high economic openness.

• Economic Indicators:

- Key indicators such as GDP, GDP per capita, GNI, and GNI per capita show significant growth over the two decades, despite fluctuations due to global events.
- The analysis of exports and imports reveals the UK's reliance on global trade and the impact of economic crises on trade activities.

• Future Considerations:

- Further analysis is needed to understand the specific categories of goods and services driving UK trade, predict future economic trends, and assess the impact of trade policies and global events.
- Addressing technological and environmental considerations can help promote sustainable trade practices and economic resilience.



THANK YOU