How far has the UK's economy and international trade recovered in this post-pandemic era?

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I. DATA STORY SUMMARY

COVID-19 has been spreading around the world for over two years, and its ultra-contagious nature and high-risk mortality rate have had a major impact on the economies and trade of countries around the world. The continuous mutation of the virus has produced new variants leading to several recurrent outbreaks. In addition to the COVID-19, the first outbreak coincided with the UK entering the Brexit transition period from early 2020 to late 2020. Brexit has also significantly impacted the UK's overseas trade in the short term. From 2020 onwards, COVID-19 and Brexit are the two main challenges for the UK.

With the UK's dynamically adapting outbreak policy, researchers' better understanding of the virus and rising vaccination rates, the impact of the outbreak is being reduced thanks to the efforts of the government and citizens. The economy and international trade are already in the process of gradually recovering compared to the initial outbreak.

The story will tell you how far the UK economy and international trade have recovered in this post-pandemic era. This report will analyse COVID-19, economic and trade data to reveal the macro impact of the outbreak on the UK. It will also consider the impact of Brexit on UK trade over the same period.

II. DATASET SUMMARY

The story needs to analyse changes and trends in the UK arising from the outbreak, so not only post-outbreak time series data is needed, but also pre-outbreak data as a forward sequence and comparison. The time-series data required can be divided by type into epidemic data, economic data, and foreign trade data. Most of the data originate from Office for National Statistics [1], the other part of the data source is the official coronavirus website developed by UK Health Security Agency [2]. These datasets are described in detail as follows.

A. COVID-19 new cases by date reported

Number of cases (people who have had at least one positive COVID-19 test result) by date reported. The data is from [2].

B. COVID-19 new deaths within 28 days of positive test

Number of people who died within 28 days of their first positive test for COVID-19. The data is from [2].

C. Trade in goods: all countries, seasonally adjusted

The annual and monthly goods export and import figures for all countries with the UK. Data can reveal the UK's trade dependency with other countries. The data is from [1].

D. UK trade in goods by classification of product by activity time series

Quarterly and annual time series of the value of UK imports and exports of goods grouped by product. Goods are attributed to the activity of which they are the principal products. The data is from [1].

E. Gross Domestic Product: chained volume measures: Seasonally adjusted £m

Chain volume measures of GDP data time series, seasonally adjusted. The data is from [1].

F. CPIH ANNUAL RATE 00: ALL ITEMS 2015=100

Time series of the annual rate of CPIH, where CPIH is a new measure of the annual rate of UK consumer price inflation that includes owner occupiers' housing costs (OOH). The data is from [1].

G. Total Trade (TT): WW: Imports: BOP: CP: SA

World-wide total import trade data with balance of payments, current prices, and seasonally adjustments. The data is from [1].

H. Total Trade (TT): WW: Exports: BOP: CP: SA

World-wide total export trade data with balance of payments, current prices, and seasonally adjustments. The data is from [1].

I. Trade in Goods (T): EU: Balance: BOP: CP: SA

European union trade balance data with balance of payments, current prices, and seasonally adjustments. The data is from [1].

J. Trade in Goods (T): Non-EU: Balance: BOP: CP: SA

Non-European union trade balance data with balance of payments, current prices, and seasonally adjustments. The data is from [1].

Some of the datasets have been cleaned and extracted before visualisation.

III. VISUALISATIONS

A. COVID-19 with international trade and economy in UK
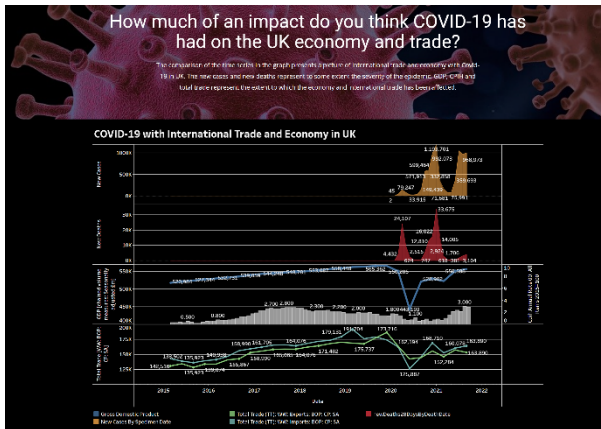

Figure 1 first chart for COVID-19, economy, and trade

1) Description

The chart is divided vertically into four sections, showing the different data, and using the same timeline to reveal the relevant links between them.

The first two sections show the number of new cases and the number of deaths for COVID-19. And the third section represents economic change. The blue line is GDP, and the grey bars are CPIH. The fourth section represents the total UK import and export trade.

2) Justification

As the first chart, I want to start by giving a clear overall impression to people reading the data story. Multiple charts give the viewer a clear visualisation of the epidemic situation and overall economic changes. The viewer can therefore clearly identify the economic and trade impact of COVID-19.

3) Narrative Design Patterns

The narrative design pattern for this visualisation is comparing and making a guess. The viewer is first asked a question to provoke thought and then given multiple charts to compare over time and in numerical terms. Side-by-side data on the same timeline allows viewers to discover for themselves the impact of the epidemic

4) Strengths and Weaknesses

The visual comparison on the timeline can give the viewer a clear picture of the impact of the outbreak and the extent of the recovery. It is easy for the viewer to see how an outbreak could lead to a significant economic downturn and a decline in trade. However, the CPIH index in this chart may not be well interpreted by viewers without some grounding in economics and understanding of UK policy changes. Also, the impact of Brexit is not mentioned in this graph as it cannot be quantified. However, later charts will address the impact of Brexit in the post-epidemic period.

5) Improvement

The timeline can be supplemented with important points in time, such as changes in UK policy, appearing of new variants and the timing of Brexit, which can assist viewers in better understanding the chart.

B. International trade with all countries

Figure 2 second chart for international trade

1) Description

The chart consists of two sections, left and right. The left half is a map with an interactive timeline below. It can reflect the total amount of trade between the UK and different countries at a given time. On the right side is a line graph of the UK's import and export trade with different countries, omitting those countries with lower trade volumes.

2) Justification

Once a visual understanding of COVID-19, the economy and trade has been gained through the first graph, a more in-depth dissection of the changes in the UK's trade dependence on other countries is necessary. The chart therefore visualises the extent of the UK's trade dependency through a moving chart that can be interacted with. The impact of the epidemic and Brexit has resulted in a changing level of trade dependency, with the countries or regions that trade most frequently with the UK in terms of imports and exports shown on the right in different colours and thicknesses of the line graph.

3) Narrative Design Patterns

The narrative design pattern for this visualisation is exploration, gradual revealing and comparing. With an understanding of the epidemic and economic data, the charts gradually move on to the finer points of changes in international trade. The interactable timeline ensures the exploration of the map. A line graph of import and export trade volumes makes it easy to compare.

4) Strengths and Weaknesses

The interactive map and line graphs are a great way to help viewers spot changes in trade as the UK is affected by the epidemic and Brexit. A weakness is that this chart assumes that the viewer is already aware of the changes in the epidemic in the previous chart, so the epidemic data is not given here to avoid repetition. This may confuse people who have no idea of the epidemic data.

5) Improvement

Adding important time points of the outbreak to the interactive timeline and line chart may be a good solution.

C. Different types of goods

Figure 3 third chart for different types of goods

1) Description

Import and export goods can be divided mainly into:
·Products of agriculture, forestry, and fishing
·Mining and quarrying
·Manufactured products
·Electricity, gas, steam, and air conditioning
·Water supply, sewerage, and waste management

Different types of goods are affected differently. The left-hand side of the chart shows data on the trade value of the five main categories of goods imported, while the right-hand side shows data on the trade value of the five main categories of goods exported. This shows the results of the trade volume of different categories of goods over time.

2) Justification

The viewer has already understood the outbreak from the above chart, so here the viewer is guided through the different goods that are affected in different ways.

3) Narrative Design Patterns

The narrative design pattern for this visualisation is comparing and gradual revealing. The use of visual graphical comparisons makes it easy for the viewer to spot the different trends that arise when different goods are affected in different ways.

4) Strengths and Weaknesses

With clear comparisons, it is easy to spot the different trends in different items. To ensure the readability of comparisons, no stacked charts or other kinds of charts are used, which could lead to rather monotonous charts.

5) Improvement

Using a richer chart style may make the chart more interesting. And this chart also relies on the viewer's knowledge of the COVID-19 data. Giving more time points or tags would be a good way to go.
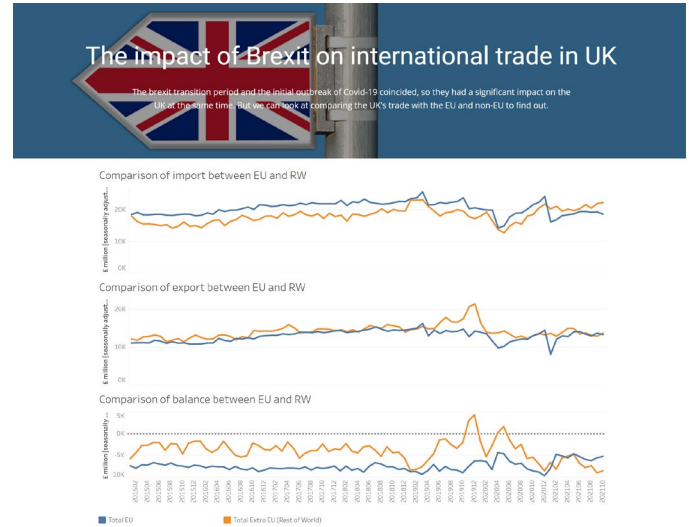
D. Graph name

figure 4 fourth chart for the impact of Brexit on trade

1) Description

The last chart, as a brief supplement, depicts the impact of Brexit. This chart is divided into three parts, namely import trade volume, export trade volume and trade balance. Each line chart is marked in blue for EU trade and in yellow for non-EU trade. Due to the breach of the trade surplus, the zero scale in the trade balance is marked separately.

2) Justification

The first COVID-19 outbreak was timed so closely to the Brexit transition that a chart is needed to supplement the information. So, it is useful to compare EU trade volumes separately from non-EU trade volumes.

3) Narrative Design Patterns

The narrative design pattern for this visualisation is comparing. Viewers can discover the changes produced by Brexit by comparing EU and non-EU data for the period of the epidemic.

4) Strengths and Weaknesses

The impact of Brexit during the epidemic period can be well identified by comparison. This acts as additional information to the previous charts. But the weakness of this chart is that it is quite boring.

5) Improvement

Combining more data or using an interesting graphical presentation would make this chart better.

IV. CONCLUSION

Firstly, the epidemic and Brexit have significantly impacted the UK economy and trade and have not returned to epidemic eve levels as of Q3 2021. GDP and import/export trade in Q3 2021 are relatively close to 2018 levels for the same period.

Secondly, the CPIH in 2020 goes lower along with COVID-19 and Brexit, before climbing rapidly. This may be because loose monetary policy stops deflation as people increase their economic activity [3].

Thirdly, in terms of international trade dependence, the UK trades most closely with Germany, China, the Netherlands, and the USA. Of these, import trade has seen a slight decline in the share of Germany, the UK's long-standing number one

importer, after the epidemic and Brexit, and a significant increase in import trade with China. In addition, Norway's import trade climbs very rapidly in 2021. In export trade, the US, the UK's long-standing number one exporter, is the most severely affected, while exports to the Netherlands have been growing over the past two years.

Fourthly, for different types of goods, the impact is very different. For example, *mining and quarrying* have seen imports increase and exports plummet over the past year. *Electricity, gas, steam and air conditioning* and *water supply, sewerage and waste management* imports and exports have been increasing since the outbreak began. *Manufacturing* and *agriculture, forestry and fishing* have been less affected.

Fifthly, when comparing the volume of trade to and from the EU and non-EU, trade with the EU did decline very slightly after the Brexit. More notably, imports into the EU have been overtaken by non-EU trade. This change can be attributed in part to the uncertainty created by the post-Brexit trade policy [4].

REFERENCES

[1] Office for National Statistics, [Online], Available: https://www.ons.gov.uk/

[2] Coronavirus (COVID-19) in the UK, [Online], Available: https://coronavirus.data.gov.uk/

[3] E. Wylie, "The Impact of Covid-19 and the Lockdown on the UK Economy," 2021.

[4] E. Gutiérrez Chacón, A. Lacuesta, and C. Martín, "Brexit: Trade diversion due to trade policy uncertainty," 2021.