ANALYSIS OF GLOBAL COMMODITY TRADE DATA

Introduction:

Welcome to our exploration of the intricacies of global trade. Our project delves into the vast world of international commerce, focusing on the rich tapestry of trade data that reveals the ebb and flow of economic ties between nations. Within this complex narrative, we have chosen to spotlight Canada - a key player on the world stage - to weave a clear and compelling story of trade dynamics. Policymakers can mine this dataset for insights into the effects of trade regulations and agreements, guiding the development of informed, strategic policies that foster economic growth and stability. Businesses and market analysts can leverage this dataset to unearth market trends, consumer demand, and emerging sectors, enabling data-driven decision-making for investments and market entry strategies.

Data Description:

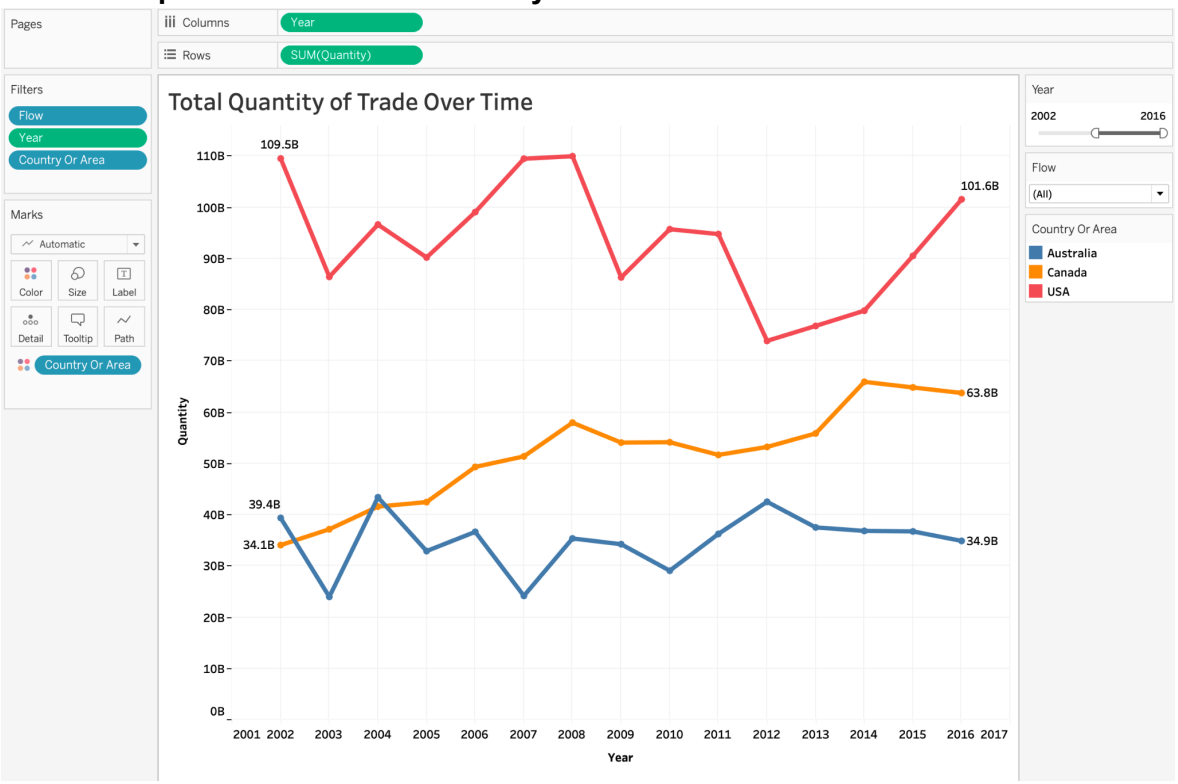
We chose the dataset from the United Nations Statistics Division. We found a Kaggle dataset that consolidated and cleaned the data from various files on the UN website. Our final dataset contains international trade information on the United States, Canada, and Australia. Some of the important variables we will be analyzing are trade flow (import/export), trade value in USD, weight in KG, commodities (oats, barley, etc.), the quantity of the commodity, and the category the commodity belongs to. Our data spans from years 1988 - 2016.

Importance of Data Set:

- Economic Insights: Our dataset is a mirror reflecting the health and vigor of Canada's export economy, capturing shifts in the global market that resonate with the heartbeat of international trade.
- Business Strategy: For companies poised on the brink of decision-making, this data serves as a compass, pointing towards fertile grounds for investment and warning of sands that shift too quickly.
- Policy Guidance: Lawmakers and economic strategists will find in this data a guide to craft policies that not only respond to the present but anticipate the future, ensuring economic resilience.
- Academic Research: Scholars will mine this rich information to build knowledge, testing theories of economic interaction and social impact.
- Public Knowledge: For the curious public, our dataset demystifies the complex networks of trade, connecting the dots between local industries and global markets.

Visualization Description/Storytelling:

1. Comparative Trade Market Analysis



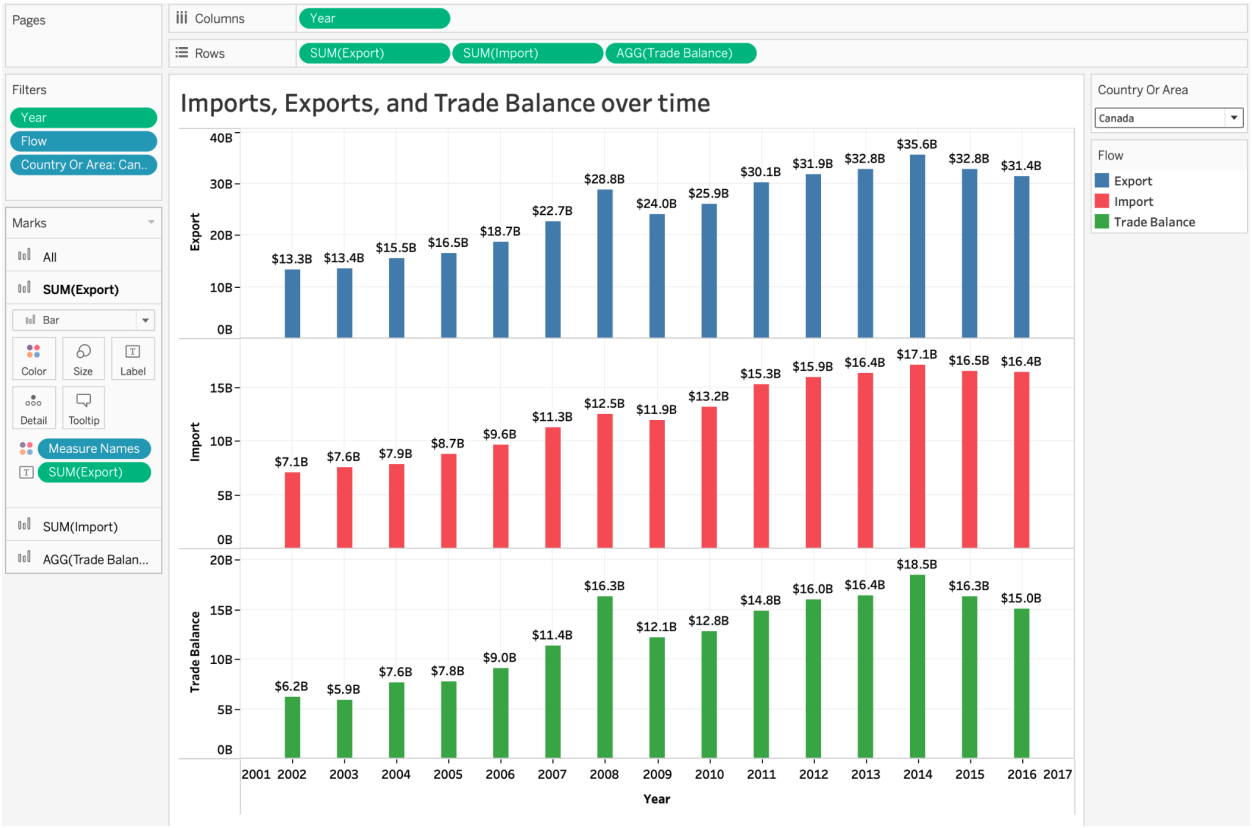
- **Description of the visual:** The visual is a line graph representing trade data from 2000 to 2016 for Australia, Canada, and the USA. It focuses on their export, import, re-import, and re-export activities, presenting a clear and continuous depiction of trade volume trends over time. This visualization aims to provide a comprehensive understanding of the temporal patterns, growth, decline, and anomalies in the trade activities of these countries.

- **Reason for choosing the visual:** The line graph was selected for its ability to effectively illustrate temporal trends and patterns in time-series data. It is particularly adept at showing progression and changes in trade volumes over an extended period. The connected data points in a line graph provide an intuitive representation, making it easier to identify trends and cyclic behaviors. This format is especially useful for comparing the trajectories of trade volumes among different countries, offering a clear and coherent depiction of complex international trade dynamics.

- **Insights:** The visualization of trade volumes from 2001 to 2017 provides clear, contrasting visual narratives for Australia, Canada, and the USA, due to its distinct color coding and precise axis labels. Notable peaks, such as Australia's in 2004, Canada's consistent rise peaking in 2014, and the significant 2001 spike for the USA, pinpoint critical economic intervals and invite analysis of extraordinary events that have influenced trade. This line graph not only captures these pivotal moments but also efficiently flags anomalies, prompting a deeper examination of the effects of trade policies and geopolitical events. The comparative layout underscores Canada's

increasing trade resilience and strategy effectiveness, particularly during its 2002 volume surge, offering essential insights into the country's economic fortitude. The graph provides a rich context for understanding the implications of previous policies and guiding future trade strategies by encapsulating the trade volumes of these countries in a single view. This allows the graph to be used as a jumping-off point for discussions on the interaction between policy decisions and global economic trends.

2. Trade Balance Over Time

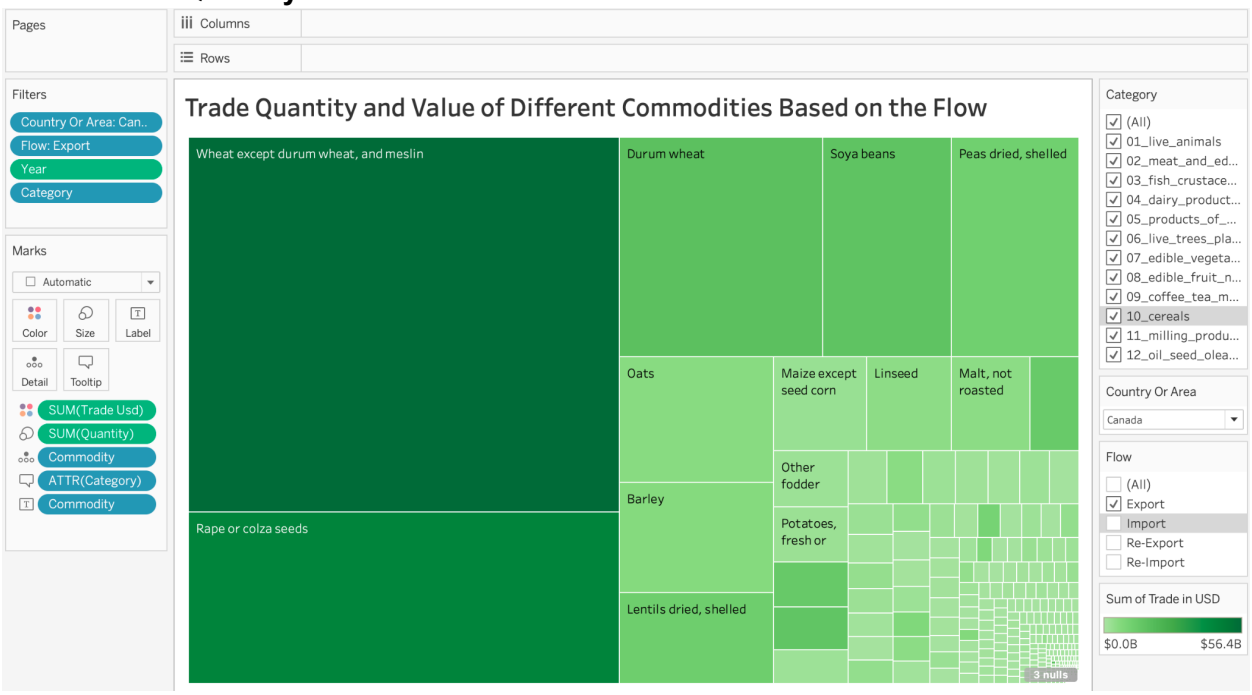


- **Description of the visual:** This bar chart helps understand the trade balance for each country and how it changes over time. Trade balance = Total exports - Total imports. For reference, a trade surplus is when the trade balance is positive (exports larger than imports) and a trade deficit is the opposite when the trade balance is negative. This visual is split up into three sections, export, import, and trade balance. It is structured like an equation, the top segment - the middle segment = the bottom segment. We added a country filter so you can choose the specific country you would like to analyze. The height of the bar is measured as the sum of trade value in U.S. dollars. The visual displays data from the years 2002 - 2016, where the value for the y-axis is recorded in billions of dollars.

- **Reason for choosing the visual:** We chose a bar chart for this visualization because it allows us to quickly see the trends for all three categories of data over time. It shows us right away if exports, imports, and trade balance follow similar paths or if there are any fluctuations within the data. It helps analyze three separate trends individually and all together.

- **Insights:** Overall, this visual is effective at giving users the big picture of how balanced their country is in the trade market, and how it has changed over time. Since we highlighted in the first visual that Canada's total trade quantity over 2002 - 2016 almost doubled in volume, we can now dig deeper to analyze Canada on its trade balance and flow of goods. Looking at Canada's export trade value over time, we see a massive increase from $13.3 billion in 2002 up to $31.4 billion in 2016, with a slight dip in 2008/2009 most likely due to the recession. Likewise, imports jumped from $7.1 billion to $16.4 billion for that same time span. Lastly, if we look at the last section which is these two values subtracted to get the trade balance, we see Canada operating in a surplus which also follows a similar upward trend. This can help us understand that the quantity volume increase that was displayed in our first visual resulted in drastic increases in the value of goods exported and imported as well. This would make sense because the larger the total trade volume, the higher the value of goods will be. However, since our trade surplus does go up, Canada seems to be profiting more from their export value compared to the value of goods they are importing over time. They are increasing the total value of goods exported by more than the value of total goods imported throughout the selected period. One explanation for Canada saw such a large increase in quantity and trade value increase could be due to NAFTA. The North American Free Trade Agreement (NAFTA) lifted tariff and non-tariff barriers to trade and investment between the U.S., Canada, and Mexico and went into effect in 1994. Canada started to see rapid growth throughout the country, an increase in GDP, and also likely caused the increase in total imports, exports, and expansion of their trade surplus.

3. Trade Quantity and Value of Different Commodities Based on the Flow



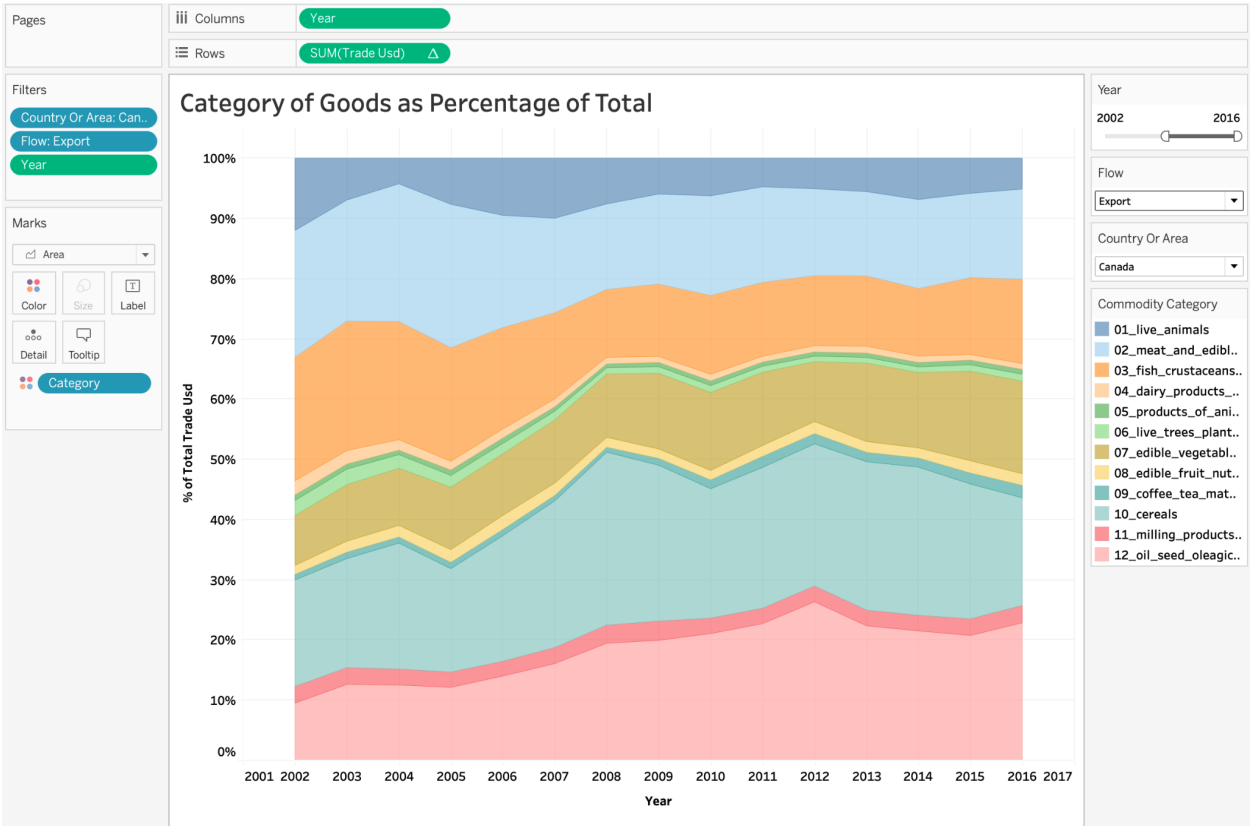
- **Description of the visual:** The visual portrays the trade quantity and amount of different commodities. It focuses on their export, import, re-import, and re-export for the categories and their respective commodities.

- **Reason for choosing the visual:** We used a treemap to show various commodities with their trade quantities and values for the three countries we selected. The reason we used treemap for this part is because it allows for easy comparison of proportions and sizes within the dataset for different categories. The dashboard filters can be used to focus on one country at a time. Moreover, the filter on the trade flow helps to visualize the data based on imports and exports. The size of each rectangle is proportional to the total quantity of the commodity, and the color represents the total trade amount in USD. Darker colors typically represent a higher trade value, and larger rectangles represent a higher quantity traded.

- **Insights:** The dashboard is useful for analyzing trade activities of the respective countries, understanding the economic impact of different commodities on their trade, and for stakeholders to make informed decisions about trade policies, market analysis, and supply chain strategies. It visually represents the data in a way that makes it easy to compare the relative importance of different commodities in terms of trade volume and value. When we focus on Canadian imports, even though Maize occupies a larger area than the Bananas in the treemap, Bananas have a darker shade than Maize. This indicates that Canada spends a lot more on exports of Bananas than Maize exports. When we look at the exports, we can see that wheat is the commodity with the largest area and the darkest shade. This indicates that wheat has the largest trade volume in terms of quantity and money when it comes to exports. The Canadian grasslands are ideally suited for wheat farming with their flat terrain, fertile soil, and long, sunny growing season. This, combined with advances in farming technology, allows Canadian wheat farmers to produce high yields of high-quality wheat. This explains why Canada is the

second-largest exporter of wheat.

4. **Trade volumes over Time**



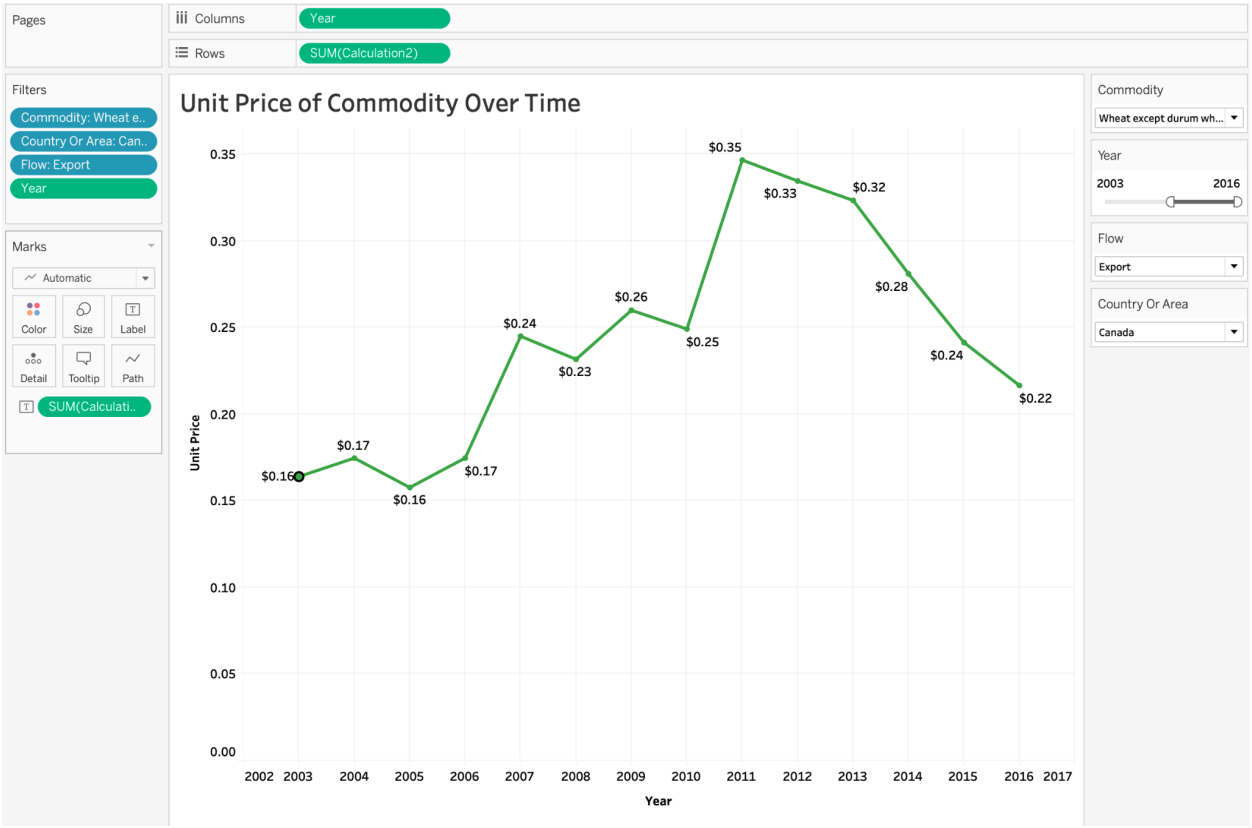
- **Description of the visual:** The visualization features a stacked area chart that illustrates trade volumes of different commodities over the chosen years. It depicts the comprehension of trade dynamics and emphasizes the importance of vegetables in the global import trade and oil seeds in the export trade.

- **Reason for choosing the visual:** We chose this area chart visual because of its effectiveness in displaying trends over time and facilitating comparisons between different commodities. The stacked design of the area chart facilitates a holistic view of cumulative trade volumes. Categorizing commodities into different colors enhances visual clarity, making it easy to differentiate between goods. This visual choice aligns with the intention to express trade volumes as percentages, allowing for a proportional analysis of each category concerning the total trade. The calculated field for percentage adds an extra layer, offering insights into the proportional contribution of each category to the total trade.

- **Insights:** The area chart provides a comprehensive view of Canada's total commodity trade for imports and exports. The rising and falling areas represent the fluctuations in trade volume, offering an initial glance at the trade dynamics. For total commodity imports, The area chart vividly illustrates the dominance of edible vegetables and certain roots and tubers. The percentage is quite constant over the years. And then followed by

Meat, takes a secondary position in the import landscape. For Canada's Export, the area chart vividly illustrates the dominance of oil seed and fruit grain seed in Canada's export portfolio. The substantial area for oil seed and fruit grain seed indicates a consistent and significant presence in international markets. Following closely, cereals emerge as another influential import commodity.

5. Unit Price of Commodity Over Time



- **Description of the visual:** This visual allows us to dig even deeper into the commodities a country is trading by tracking the unit price of the goods over time. We created a calculated field, total trade in USD/total quantity to create our best estimate for unit price. We have the year range on the x-axis and the unit price on the y-axis. You can filter by country, the flow of trade (import/export), and lastly commodities for the one you would like to look at.

- **Reason for choosing the visual:** This simple line chart displays how the price fluctuates over time. We included the price of each year on the line so you can easily see the value without having to estimate. In the future, a more sophisticated dashboard can be created where the previous treemap sheet can serve as a filter and directly allow you to choose the commodity from that visual.

- **Insights:** This graph shows us the story of Canadian wheat prices over time. In 2002, the prices started going up because more people around the world wanted to buy wheat and had the money to do so. In 2008, when many businesses were struggling because

of a big economic crisis, the price of wheat was still doing well. This is likely because wheat is a basic food that people buy even when times are tough. After that peak in 2008, the prices went up and down quite a bit. This shows that the market was trying to figure out a good price for wheat, considering how much people wanted it, how much wheat was being grown, and how the economy was doing. Then, after 2013, we saw the prices start to go down. This could be because farmers got good at growing wheat with new technology, which meant there was a lot of wheat available. Also, more countries were selling wheat, so there was too much supply compared to demand, and that made the prices drop. So, looking at this graph helps us understand how different things like people's needs, technology, and competition between countries can change the price of wheat. It gives the people who grow wheat and sell it some clues about what might happen with prices in the future

Conclusion:

This report has explored international trade, revealing how various factors like technology, policy, and global events influence trade volumes. We've seen that trade is complex and constantly changing. This visualization helps us understand these changes and prepares us for future shifts in global trade. Ongoing research and adaptability are crucial in this ever-evolving field. This project is just a part of a deeper exploration into the world of international trade.