AUSTRALIAN INTERNATIONAL TRADE

1988-2023

32146 Data Visualization and Visual Analytics
Assessment Task 3 - Visual Analytics
Autumn 2024

Avelia Sutjipto – 14229239
avelia.a.sutjipto@student.uts.edu.au

Contents

Executive Summary

This report provides a comprehensive analysis of Australian international trade from 1988 to 2023, focusing on both import and export trends across 10 main categories and 67 subcategories. By examining statistical and analytical patterns, we have identified significant shifts and trends in trade activities over the years.

Key Findings:

- Overall Trade Growth
    - There has been a significant increase in both export and import values over the study period. When comparing 1988 to 2023, export values increased by 1316%, and import values by 976%.
    - Export drastically increases since 2016 although it was briefly impacted by Covid19 in 2020.
    - There was an all-time high of export value of $590,000 million in 2022 due to the free trade agreement between Australia and UK.
- Category Trends
    - Food and live animals experienced a sharp decline in export in 2003 but overall showed consistent growth in analytical and dollar values, indicating its significant role in Australia's export portfolio.
    - Machinery and transport equipment remained as the largest import category accounting to an overall of 40%.
    - Crude materials and mineral fuels are categories with substantial increases in export percentages and a recent statistic value of more than 50%.
- Notable Yearly Changes:
    - 2008 and 2022 were pivotal years with significant increases in both exports and imports across various categories, reflecting broader economic and trade dynamics.
    - Conversely, 2009 saw notable declines in multiple categories, highlighting the impact of global economic fluctuations.
- Dashboard and Storyboards:
    - The interactive dashboards and storyboards effectively visualized the complex data, making it easier to identify and understand the trends and changes over time.
    - These tools highlighted key insights, such as the fluctuations in subcategory values and the impact of specific trade categories on overall trade patterns.

1. Dataset overview

The dataset used in this report is taken from the ABS Statistics which contains data of Australian international trade from the year 1988 to 2023. The dataset contains both import and export information and includes 10 main categories and 67 sub-categories as well as a total attribute. For each category and subcategory, a series ID is presented and the value for this dataset are all in $ Millions. Further information on the categories and subcategories are as follows:

1. Food and live animals: (a) Live animals (excl. fish (not marine mammals) crustaceans, molluscs and aquatic invertebrates of SITC Division 03); (b) Meat and meat preparations; (c) Dairy products and birds' eggs; (d) Fish (excl. marine mammals) crustaceans, molluscs and aquatic invertebrates, and preparations thereof (excl. extracts and juices of fish, crustaceans, molluscs or other aquatic invertebrates, prepared or preserved of SITC 01710); (e) Cereals and cereal preparations; (f) Vegetables and fruit; (g) Sugars, sugar preparations and honey; (h) Coffee, tea, cocoa, spices, and manufactures thereof; (i) Feeding stuff for animals (excl. unmilled cereals); (j) Miscellaneous edible products and preparations.
2. Beverages and tobacco: (a) Beverages; (b) Tobacco and tobacco manufactures.
3. Crude materials, inedible, except fuels: (a) Hides, skins and furskins, raw; (b) Oil-seeds and oleaginous fruits; (c) Crude rubber (incl. synthetic and reclaimed); (d) Cork and wood; (e) Pulp and waste paper; (f) Textile fibres (excl. wool tops and other combed wool) and their wastes, not manufactured into yarn or fabric; (g) Crude fertilizers (excl. those of Division 56) and crude minerals (excl. coal, petroleum and precious stones); (h) Metalliferous ores and metal scrap; (i) Crude animal and vegetable materials, nes.
4. Mineral fuels, lubricants and related materials: (a) Coal, coke and briquettes; (b) Petroleum, petroleum products and related materials; (c) Gas, natural and manufactured.
5. Animal and vegetable oils, fats and waxes: (a) Animal oils and fats; (b) Fixed vegetable fats and oils, crude, refined or fractionated; (c) Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, nes.
6. Chemicals and related products, nes: (a) Organic chemicals; (b) Inorganic chemicals; (c) Dyeing, tanning and colouring materials; (d) Medicinal and pharmaceutical products; (e) Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations; (f) Fertilisers (excl. those of group 272); (g) Plastics in primary forms; (h) Plastics in non-primary forms ; (i) Chemical materials and products, nes.
7. Manufactured goods classified chiefly by material: (a) Leather, leather manufactures, nes, and dressed furskins; (b) Rubber manufactures, nes; (c) Cork and wood manufactures (excl. furniture); (d) Paper, paperboard and articles of paper pulp, of paper or of paperboard ; (e) Textile yarn, fabrics, made-up articles nes, and related products; (f) Non-metallic mineral manufactures, nes; (g) Iron and steel; (h) Non-ferrous metals; (i) Manufactures of metals, nes.
8. Machinery and transport equipment: (a) Power generating machinery and equipment; (b) Machinery specialized for particular industries; (c) Metalworking machinery; (d) General industrial machinery and equipment, nes, and machine parts, nes; (e) Office machines and automatic data processing machines; (f) Telecommunications and sound recording and reproducing apparatus and equipment; (g) Electrical machinery, apparatus and appliances, nes, and electrical parts thereof (incl. non electrical counterparts, nes, of electrical household type equipment); (h) Road vehicles (incl. air-cushion vehicles); (i) Transport equipment (excl. road vehicles).
9. Miscellaneous manufactured articles: (a) Prefabricated buildings and sanitary, plumbing, heating and lighting fixtures and fittings, nes; (b) Furniture and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; (c) Travel goods,

handbags and similar containers; (d) Articles of apparel and clothing accessories; (e) Footwear; (f) Professional, scientific and controlling instruments and apparatus, nes; (g) Photographic apparatus, equipment and supplies and optical goods, nes; watches and clocks; (h) Miscellaneous manufactured articles, nes.

10. Commodities and transactions not classified elsewhere in the SITC: (a) Special transactions and commodities not classified according to kind; (b) Gold coin whether or not legal tender, and other coin being legal tender; (c) Coin (excl. gold coin) not being legal tender; (d) Gold, non-monetary (excl. gold ores and concentrates); (e) Combined confidential items excluding some of SITC 28099 (exports only) and some of SITC 51099 (imports only).

2. Statistical pattern (Ratio)

In this report, the statistical pattern is used to determine the yearly relative percentage or proportion of each category's export or import in comparison to the respective total annual import or export. For each year, the formula to calculate the percent proportion for each category *i=0* to *9* is:

$$Percentage_{(i\text{-}import)} = sub\text{-}total_{(i\text{-}import)} / total_{(import)}$$

$$Percentage_{(i\text{-}export)} = sub\text{-}total_{(i\text{-}export)} / total_{(export)}$$

Where $\sum_{i=0}^{9} Percentage_{(i-import)} = 100\%$ and $\sum_{i=0}^{9} Percentage_{(i-export)} = 100\%$

For example, to calculate the ratio of export of category *0. Food, Live Animals, etc* in the year 1988, we can use the formula =B4/$CA4, where B4 is the original value of category *0* in the year 1988 divided by CA4 which is the corresponding total value. Therefore, in the year 1988 the percentage can be calculated as: Percentage = 7908/42370 = 18.66%.

The statistical report is also used to calculate the yearly relative percentage or proportion of each subcategory's export or import in comparison to the respective category' annual import or export. For each year, the formula to calculate the percent proportion for each subcategory *j=0* to *n*, where *n* is the maximum number of subcategories for each category *i*, is as follows:

$$Percentage\text{-}Sub_{(i,\,j\text{-}import)} = sub\text{-}total_{(i,\,j\text{-}import)} / sub\text{-}total_{(i\text{-}import)}$$

$$Percentage\text{-}Sub_{(i,\,j\text{-}export)} = sub\text{-}total_{(i,\,j\text{-}export)} / sub\text{-}total_{(j\text{-}export)}$$

Where $\sum_{j=0}^{n} Percentage - Sub_{(i,j-import)} = 100\%$ and $\sum_{j=0}^{n} Percentage - Sub_{(i,j-export)} = 100\%$

For example, to calculate the ratio of export of sub-category *00. Live Animals* in the year 1988, we can use the formula =C4/$B4, where C4 is the original value of sub-category *00* in the year 1988 divided by B4 which is the corresponding total value of category *0*. Therefore, in the year 1988 the subcategories' percentage can be calculated as: *Percentage-Sub* = 322/7908 = 4.07%.

Note that when checking the sum of the percentage in this dataset there are some subcategories' values that do not add up to 100%. These are due to inconsistencies in the dataset where the subcategory values do not add up to the corresponding category's total value. For example, when checking the percentage sum of export of category 4 in the year 1990, the total value is more than the actual sum of the subcategories. Conversely, when checking the percentage sum of export of category 4 in the year 1988, the total value is less than the actual sum of the subcategories.

3. Analytical pattern (Changes)

In this report, the analytical pattern is used to measure the yearly change for each category and sub-category. For this, all category and subcategory values for the year 1988 is set to 100% as this is the first year recorded in the dataset. On the other hand, for the year 1989-2022 the formula to calculate the changes are as follows:

Percent Change = Current Year Value / Previous Year Value

For example, to calculate the change of export of category *0. Food and live animals* in the year 1989, we can use the formula = B5/B4, where B5 is the number of export of category *0* in the year 1999 divided by B4 which is the number of export of category *0* in the year 1988. Therefore, in the year 1999 the change for category *0* can be calculated as: *Precent Change* = 9491/7908 = 120.02%.

Note that, however, in some cases the values of this formula would result in the error #DIV/0!, as there are some category or subcategory which has 0 as the value. Hence, when performing the division, the result would be an error.

4. Table Transformation

The last step to perform in Excel is to combine the import and export sheets for each of the dataset (statistical, analytical, and raw dollar). This is done by creating another worksheet with a new column called Trade in addition to the other column headers. Next we can just copy all the data instances from each worksheet of export and import into this new sheet and specifying the trade type of either export or import.

Furthermore, to simplify the dataset, we can also further transform the pivoted data into unpivoted data by adding another column called category/subcategory which will act as the label for each data point, as well as a column called value which will have either the percentage value from previous calculations or the raw dollar value recorded. For further detail, for subcategory we can also create another column called main category to know which subcategory belongs to which category.

5. Main Categories

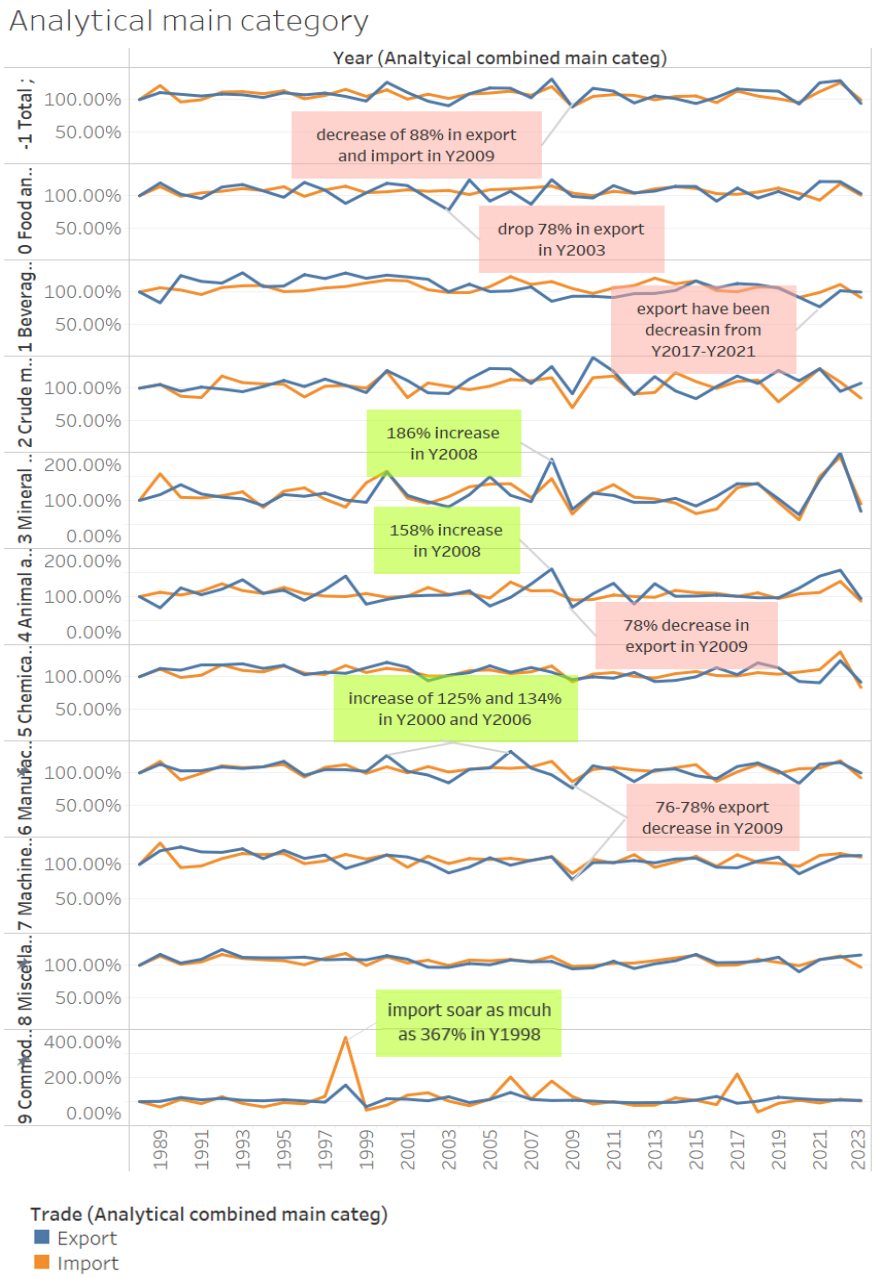

Figure 1 Line chart comparison for analytical values of main category

5.1 Analytical Findings

- The total changes fluctuate over the years but overall remain consistent with the last recorded analytical value (Y2023) being 99.37% and 93.92% for import and export trades respectively. The highest export change was in 2008 as much 132%, while the highest import change was in 2022 as much 126%.
- There has been a huge drop of 78% in export of food and live animals in the year 2003.
- The import changes for beverages and tobacco are higher compared to the respective export changes in the year 1990-2004. However, in the year 2005-2015, there is a shift in which the percentage changes for import falls below the percentage changes for export. A dditionally, there is also a low-time export decrease of 76.85% in 2021.
- Export of manufactured goods classified chiefly by material had a high increase in the year 2000 and 2006, respectively, 125% and 134%.
- There is a huge soar of import on commodities and transactions (not classified elsewhere in the SITC) as much as 367% in the year 1998.
- In the year 2008, there is an increase in the total analytical changes for both export (132%) and import (120%) coming from most categories. Notable increased were from the category (export %, import%): mineral fuels, lubricants and related materials (186%, 145%), commodities and transactions not classified elsewhere in the SITC (104%, 185%), animal and vegetable oils, fats and waxes (158%, 113%), crude materials, inedible (134%, 116%), as well as food and live animals (125%, 115%).
- In the year 2009, there is a notable decrease on the following categories: import of crude materials, inedible, except fuels (70%), export and import of mineral fuels, lubricants and

related materials (81%, 72%), export of animal and vegetable oils, fats and waxes (78%), export of manufactured goods classified chiefly by material (76%), as well as export of machinery and transport equipment (78%).

- In the year 2022, there in an increase in total analytical changes for both export (130%) and import (126%) trades coming from most categories. Notable increase were from the category (export%, import%): mineral fuels, lubricants and related materials (199%, 190%), animal and vegetable oils, fats and waxes (155%, 132%), as well as chemicals and related products (125%%, 139%).

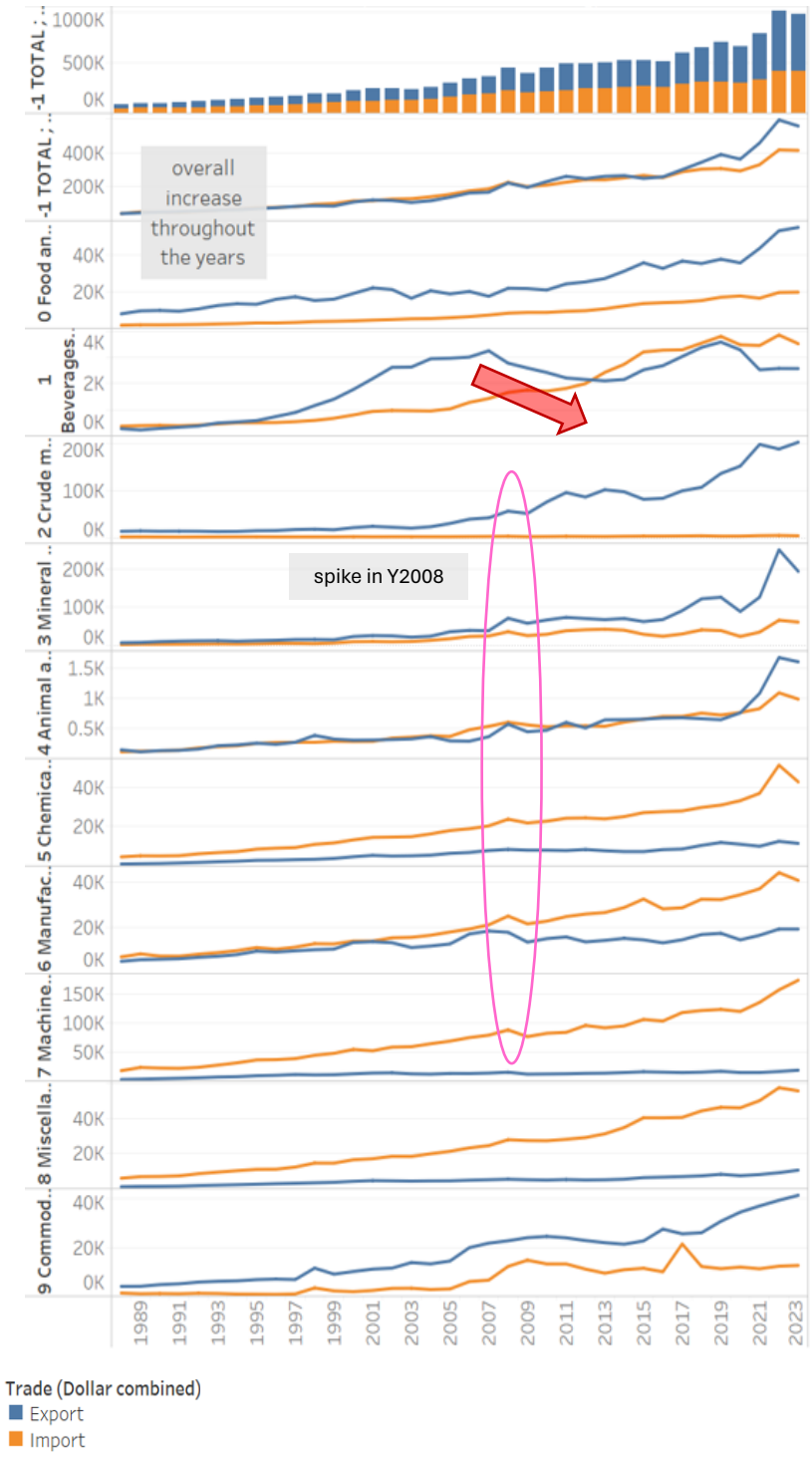

Figure 2 Line and bar chart comparison for dollar values of main category

5.2 Dollar Findings

- Overall, there has been a steady increase in both export and import trades throughout the years with export dollar values mostly sustaining the import values.
- In the year 2023, export rate has increased as much as 1316% and import as much as 976% when compared to the first recorded year, 1988.
- Export values for the category food and live animals; crude materials, inedible, except fuels; mineral fuels, lubricants and related materials; and commodities and transactions not classified elsewhere in the SITC, has always been higher compared to the corresponding import values.
- Conversely, import values for the category chemicals and related products, nes; machinery and transport equipment; and miscellaneous manufactured articles, has always been higher compared to the corresponding export values.
- When previously mentioned export and import values stay higher than the corresponding import and export values, usually indicates that there is not much increase in the trade type with lower value. For

example, imports of crude materials, inedible, except fuels, the line is considerably constant. Similarly, for exports of machinery and transport equipment, the line is also steadily in the lower end.

- There is also a noticeable spike in 2008 for most subcategories and the total annual value.
- Additionally, there is a decline in export of beverages and tobacco in between the year 2007 to 2013; the value dropped from 3247 to 2102.

5.3 Export Statistical Findings

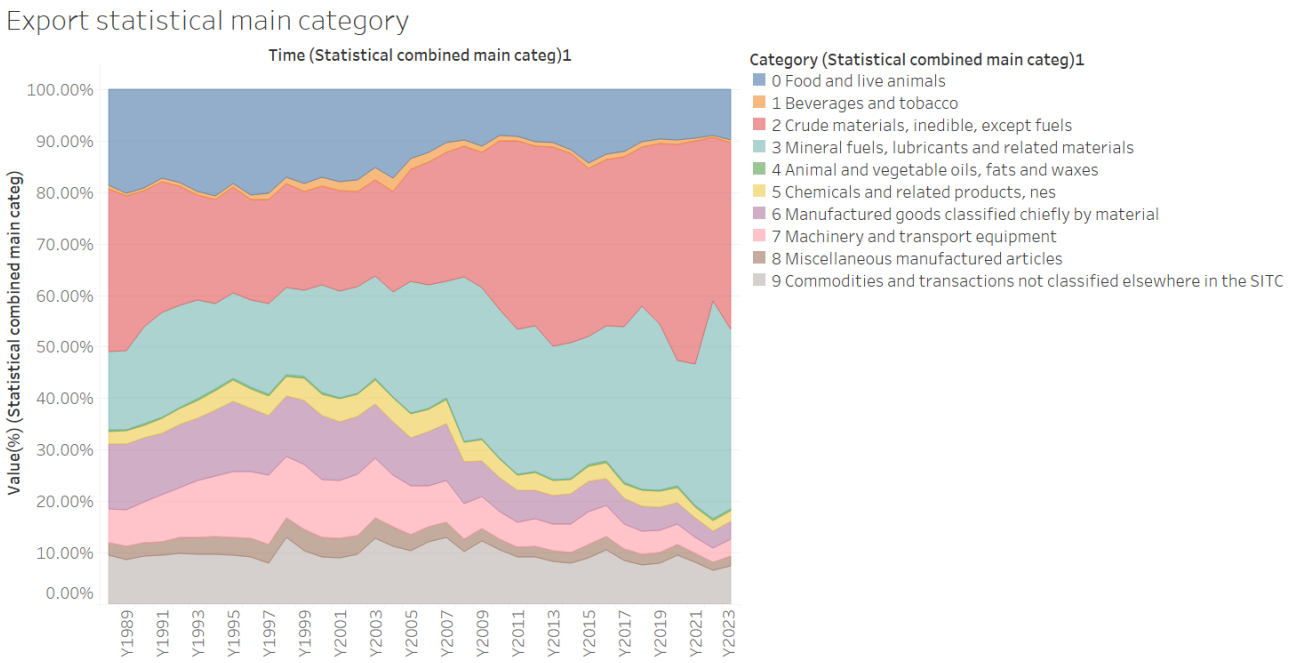

Figure 3 Statistical area chart of export main category throughout the years

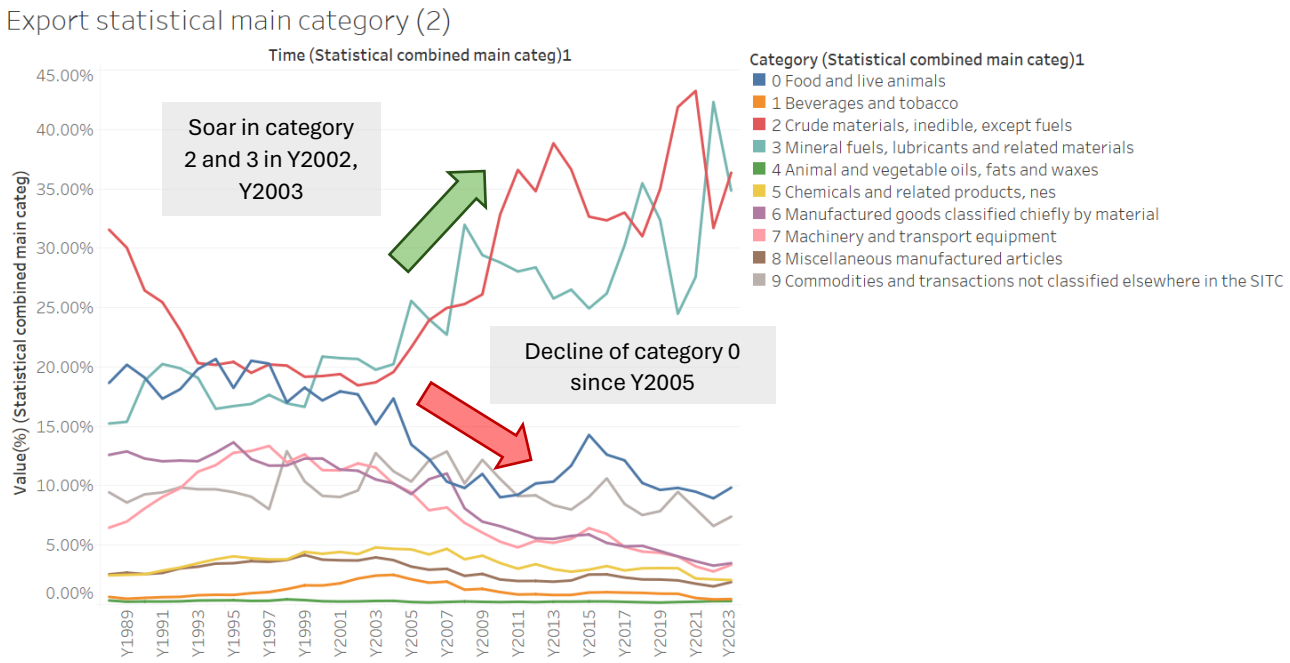

Figure 4 Statistical line graph of export main category throughout the years

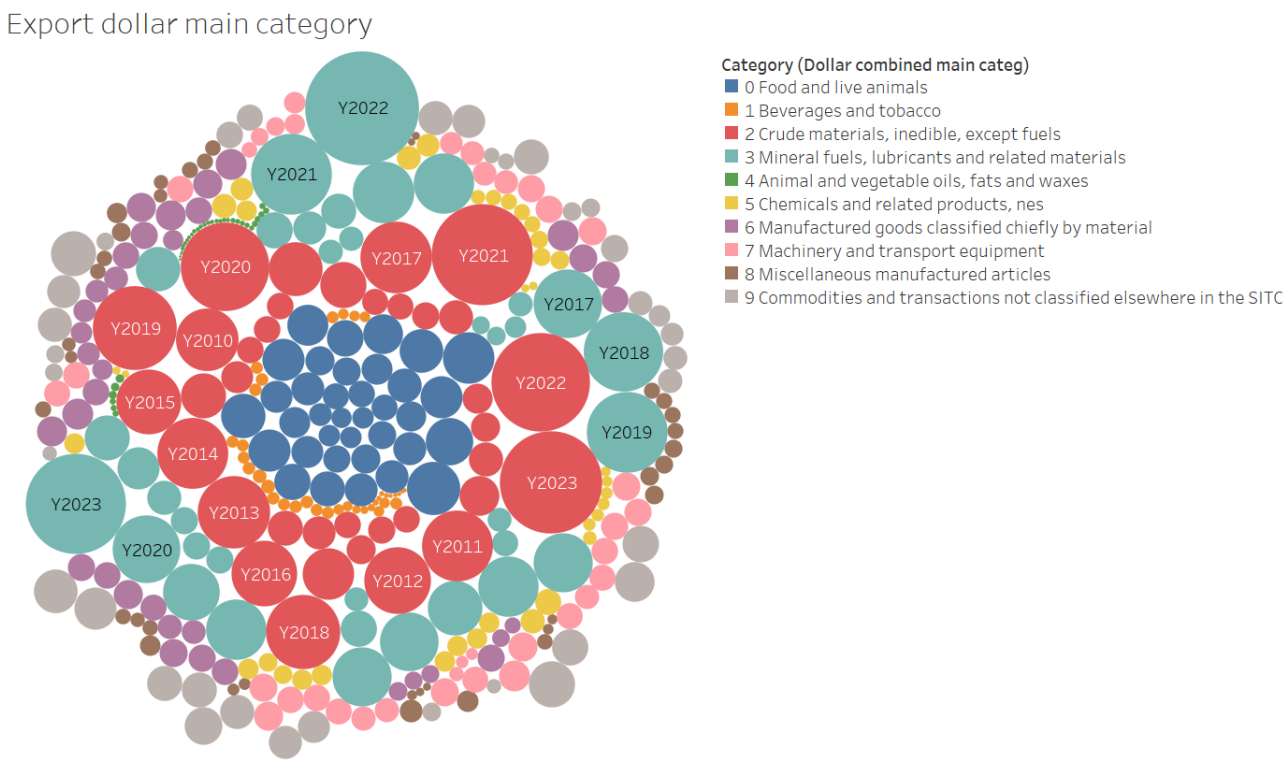

Figure 5 Statistical bubble chart of export main category throughout the years

As can be seen from *Figure 3*, *4*, *5*, the highest contributing export for Australia comes from the category crude materials, inedible, except fuels and the category mineral fuels, lubricants and related materials. There is a huge soar in percentage of exports in these categories, especially in the year 2002 and 2003. Contrarily, there is a drop of exports in food and live animals in the year 2005. Other export categories also seemed to be increasing and was most evenly spread out in the year 1995-2003. But afterwards, the previously mentioned categories accumulate to most of the export ratio.

5.4 Import Statistical Findings

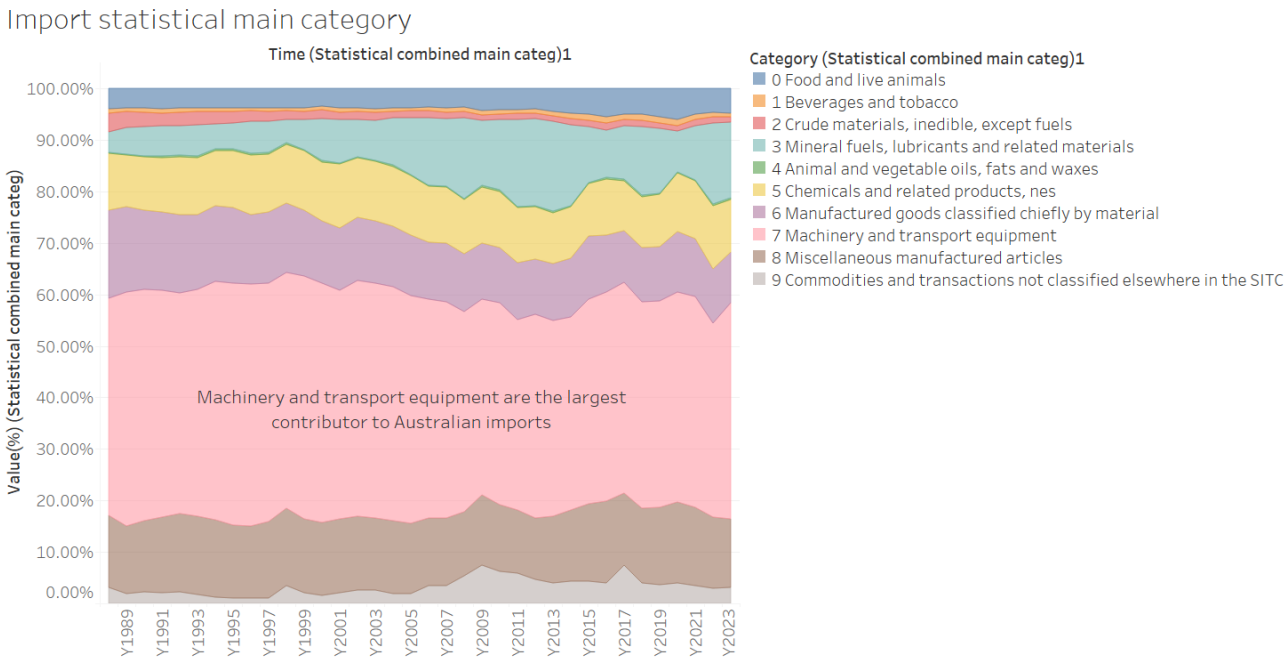

Figure 6 Statistical area chart of import main category throughout the years

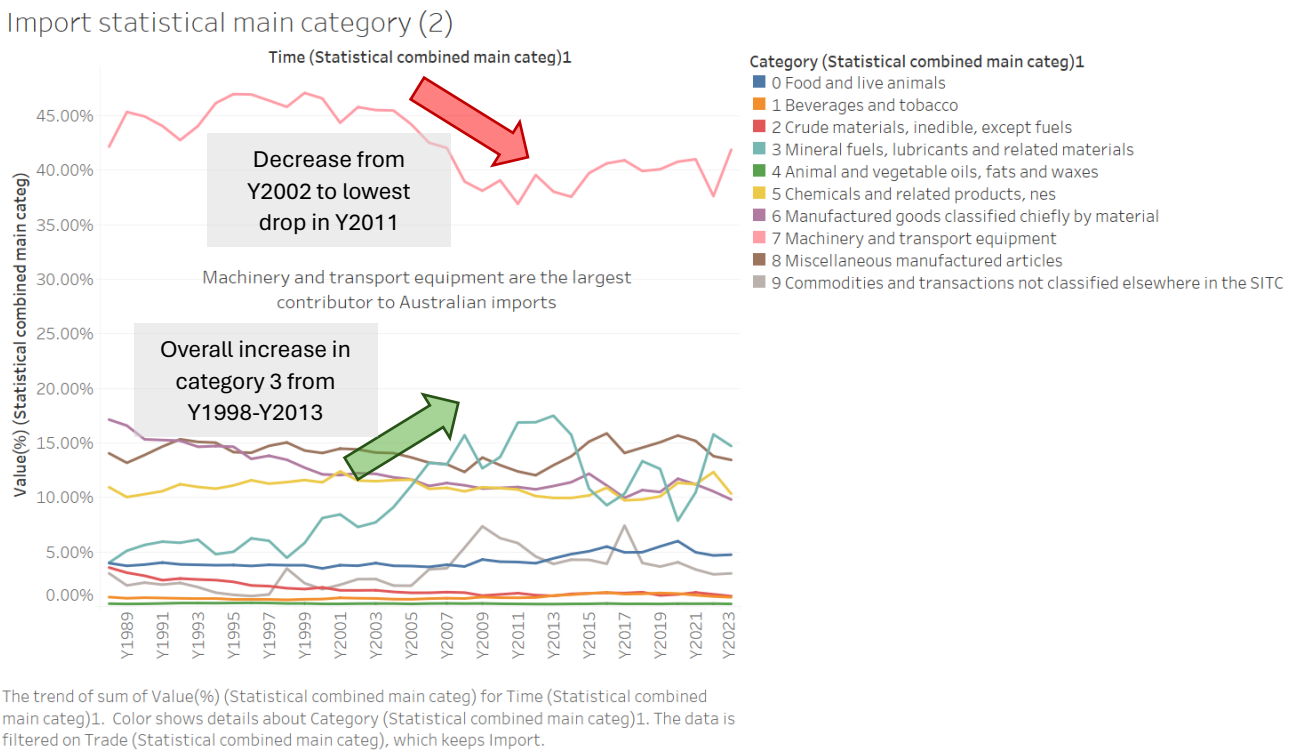

Figure 7 Statistical line graph of import main category throughout the years

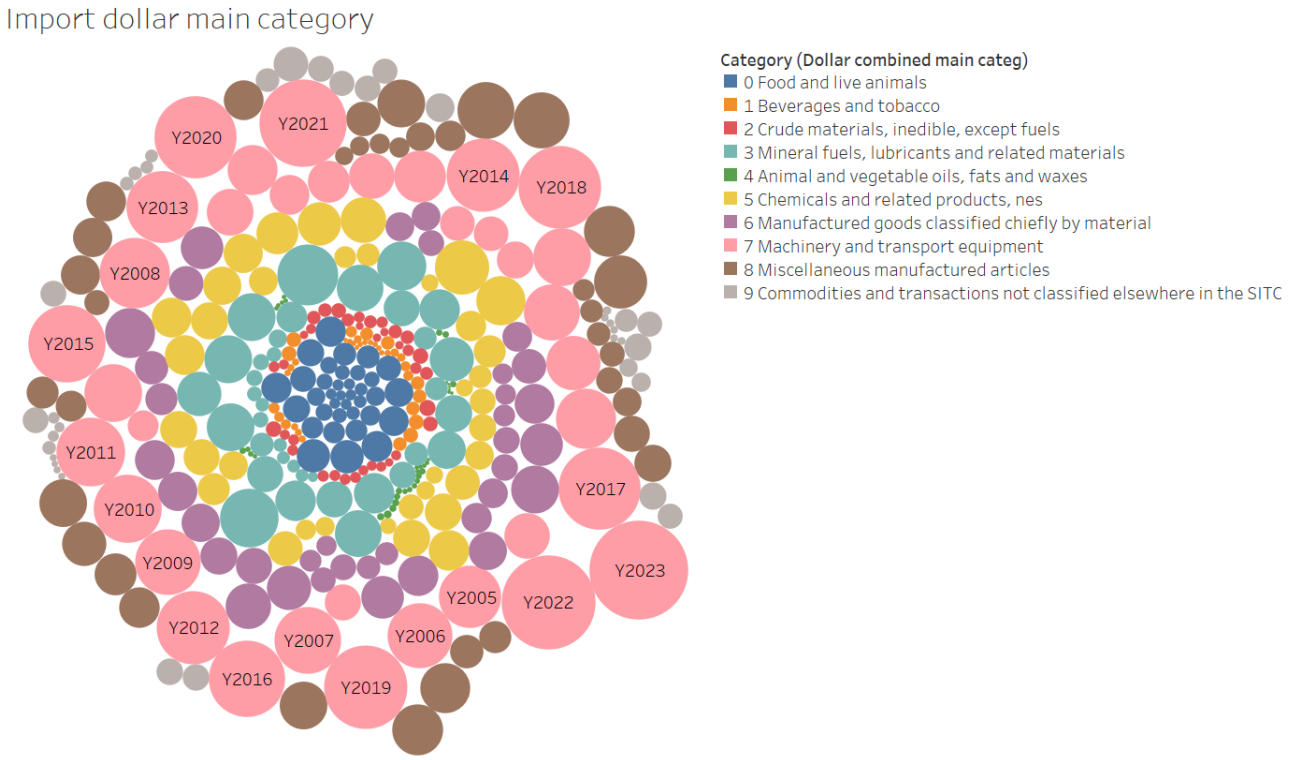

Figure 8 Statistical bubble chart of import main category throughout the years

As can be seen from *Figure 6*, *7*, *8*, machinery and transport equipment are Australia's largest import category by a large margin. It accounts for around 40% of the ratio and even almost reached a percentage of 50% in the year 1994-2000. There is however a decrease of percentage in this category which happened from 2002 and dropped to the lowest percentage of 37% in 2011. Conversely, there is an increase of mineral fuels, lubricants, and related materials between 1998-2003. This number than significantly drop but went back up in 2022. There are not many imports on crude materials, inedible,

except fuels, as well as beverages and tobacco. Additionally, for the category animal and vegetable oils, fats and waxes are also a low category for both import and export trades.

6. Dashboards

6.1 Dashboard #1 – Yearly main category

The first dashboard displays a collection of graphs and charts related to the main category and its yearly statistics and analytics. This includes a statistical treemap of the main categories separated into export and import. An analytical circle view of the exports and imports, as well as a stacked bar chart for the dollar values. There is a filter for the year so that user can see the changes throughout.

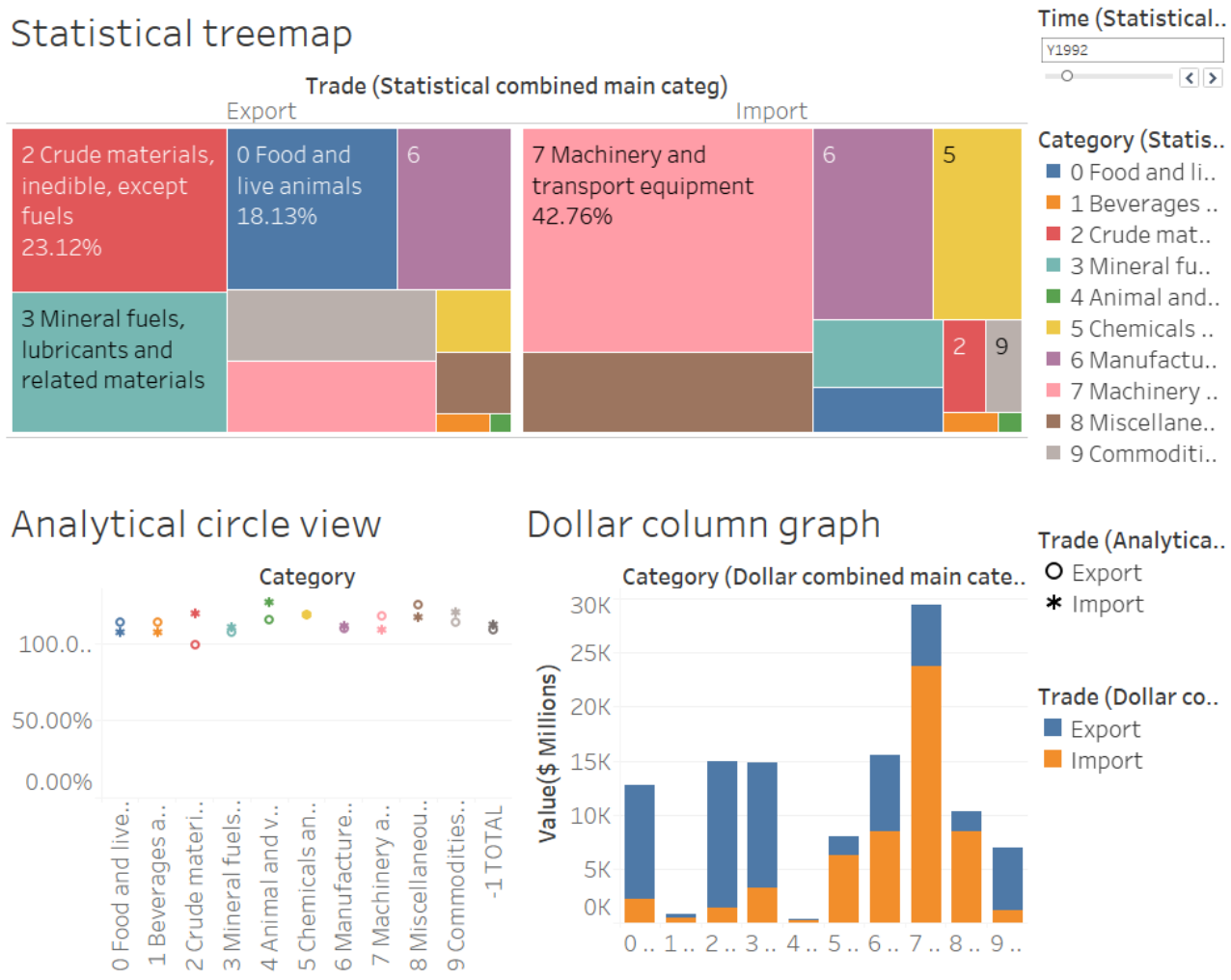

Figure 9 Yearly main category dashboard

6.2 Dashboard #2 – Yearly subcategory

The second dashboard displays a collection of graphs and charts related to subcategories and its yearly statistics and analytics. This includes a statistical pie chart split into the export and import trades. As well as a butterfly chart which display the dollar values of the trades for the subcategories under the selected main category. Hence, for this dashboard there are two filters which can be adjust. The first is choosing which main category to get further detail on the breakdown of its subcategories, and the second is the time/year to be displayed.

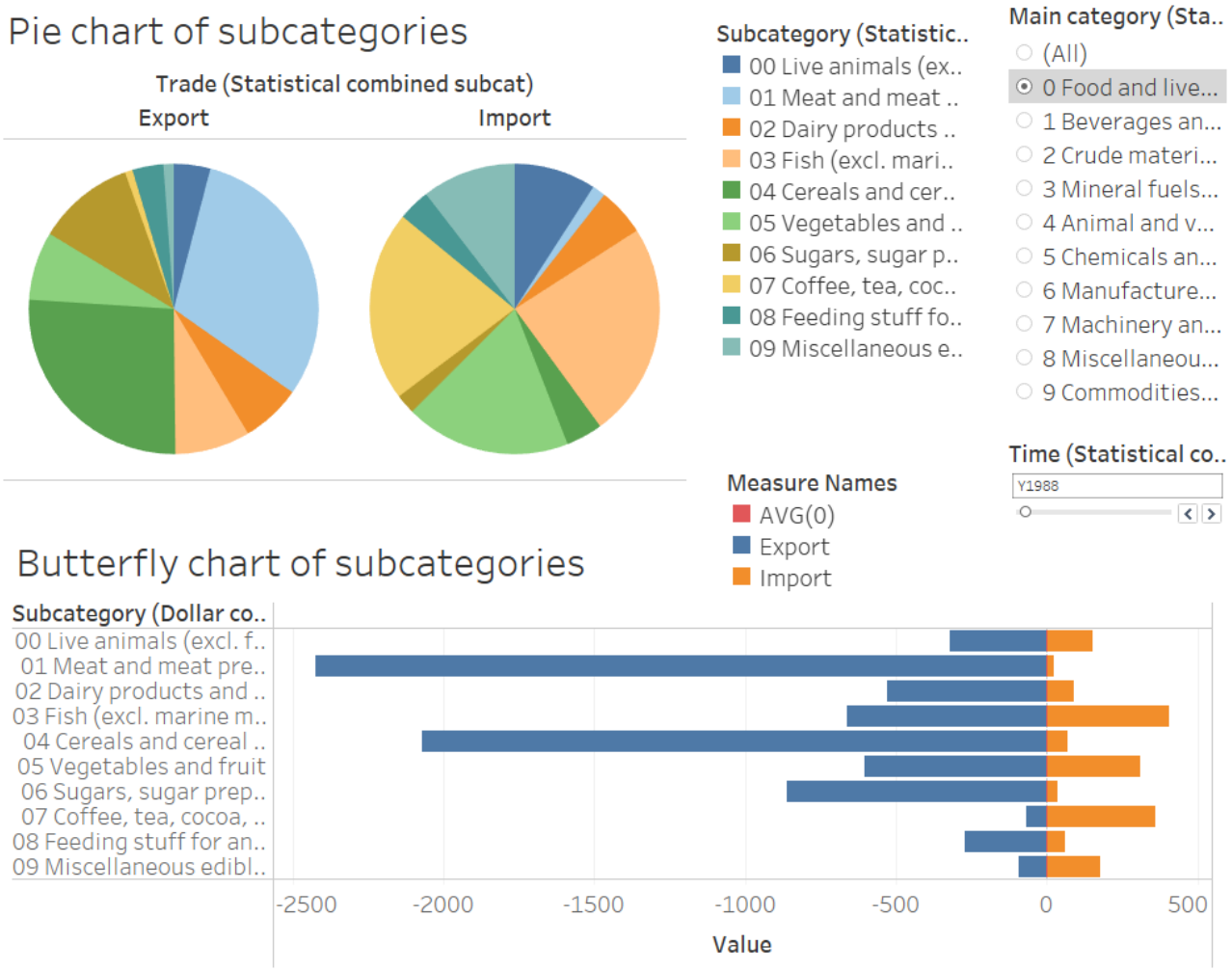

Figure 10 Yearly subcategory dashboard

6.3 Dashboard #3 & #4 – Main category, subcategory, throughout the years

The third and fourth dashboard displays a collection of graphs and charts of a particular category and its subcategories throughout the year. The third dashboard (*Figure* 11) consists of a main category filter, an import and an export combo chart, each with analytical values in the form of a line and the dollar values in the form of columns. Additionally, it also a breakdown the imports and export analytical value of the correlating subcategories throughout the years in the form of line charts.

The fourth dashboard (*Figure 12*) also includes a main category filter. In addition, it consists of a stacked bar chart and a line chart of the respective subcategory statistical value (following the main category input) separated into export and import trades.

In the example of *Figure 11* and *Figure 12*, it displays the information on main category 0 which is food and live animals. As can be seen, there is a significant and steady dollar increase for both export and import, going up to as much as 50K and 20K ($millions) in the end of 2023. There is, however, a fluctuating values for the analytical percentage with export values having a more considerable change throughout the years in comparison to import values.

Furthermore, the category 0 consists of 10 subcategories which is mentioned earlier in section 1. Dataset Overview. *Figure 12* shows that for export, the subcategory meat and meat preparation, and cereals and cereals preparation, contribute overall around 50% of the export percentage in this category. From *Figure 11* we can also see that there are, also, some cases where the analytical value

for the subcategory cereal spiked up, specifically in the year 1996, 2005, 2008, and 2021. Notable fluctuations, however, happened in 2018-2020 where the exports ratio for cereals decreased to 20% or less (also dropped in analytical to 70%) but increased the ratio for meat to about 40%. Similarly, there is also a significant drop of sugars, sugar preparation and honey ratio in the year 1998 (again dropped in analytical to 10%) and remained on a low ratio number from then on.

Imports on the other hand, has a more balanced ratio with more subcategory's domination. Specifically, the following four subcategories makes up most of the import ratio: miscellaneous edible products, coffee, tea, cocoa, spices, vegetables and fruits, as well as fish. Although there are some fluctuations within these subcategories, the most noticeable are the increase of import in miscellaneous edibles and a decrease of import in fish products. Moreover, for both import and export there is an overall low percentage of the subcategory live animals.

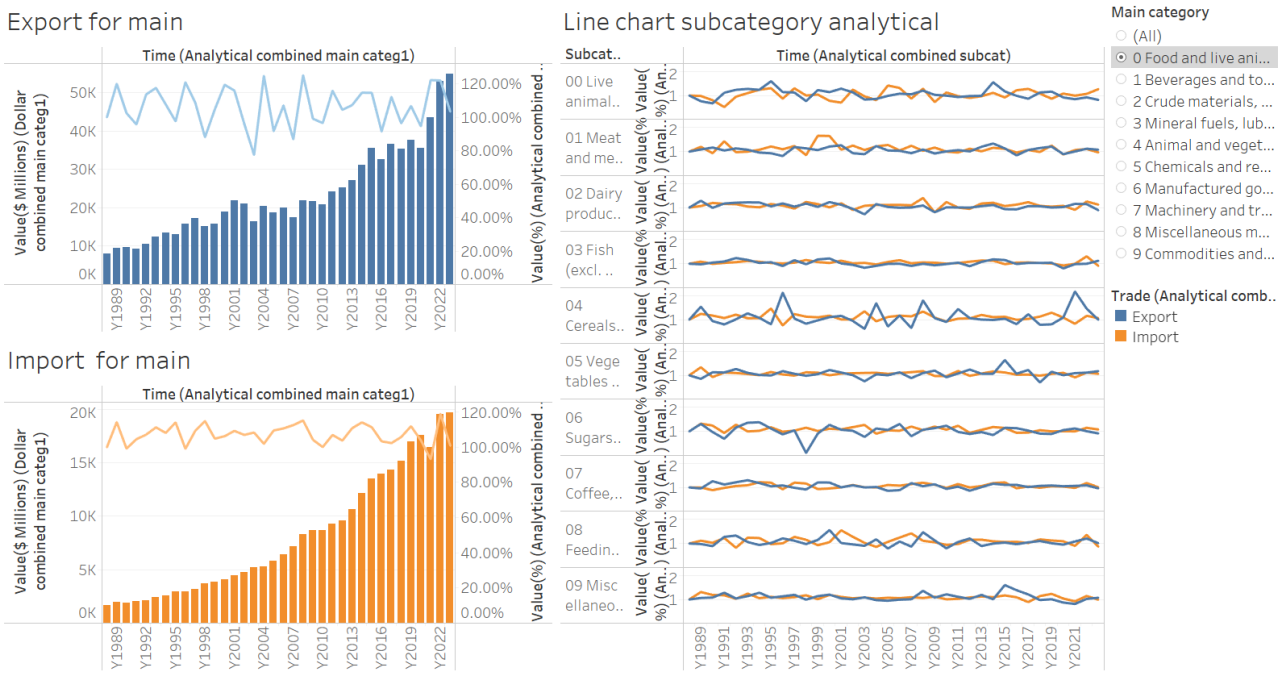

Figure 11 Main category, subcategory, throughout the years

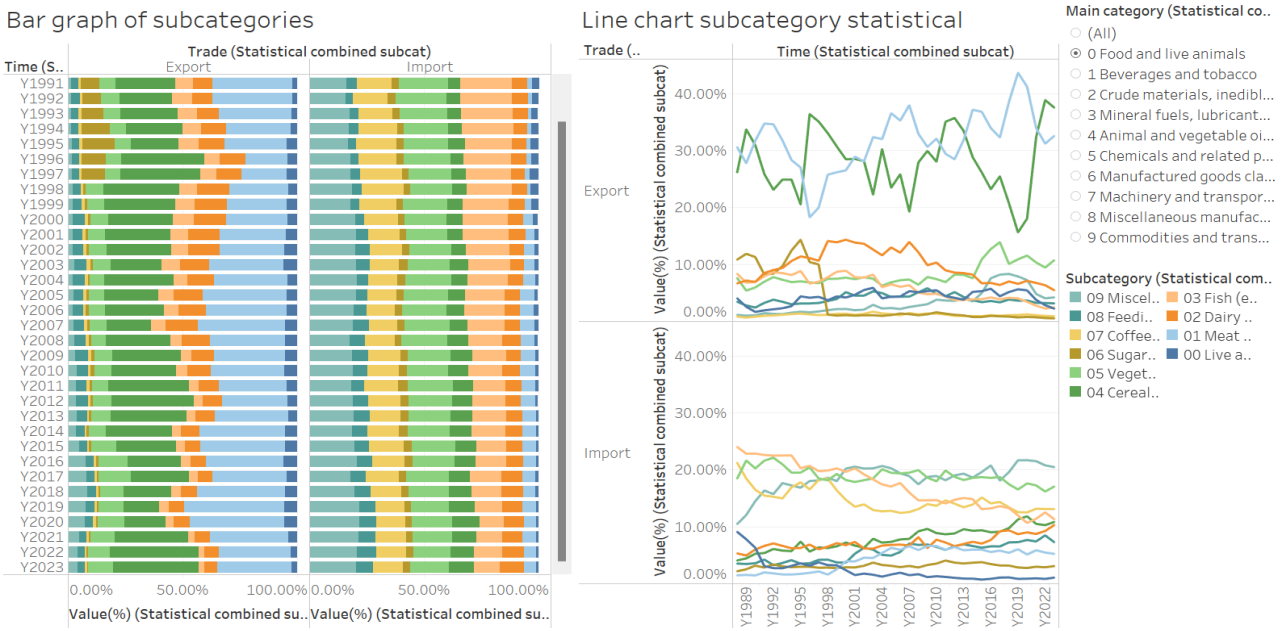

Figure 12 Subcategories statistical

7. Storyboards

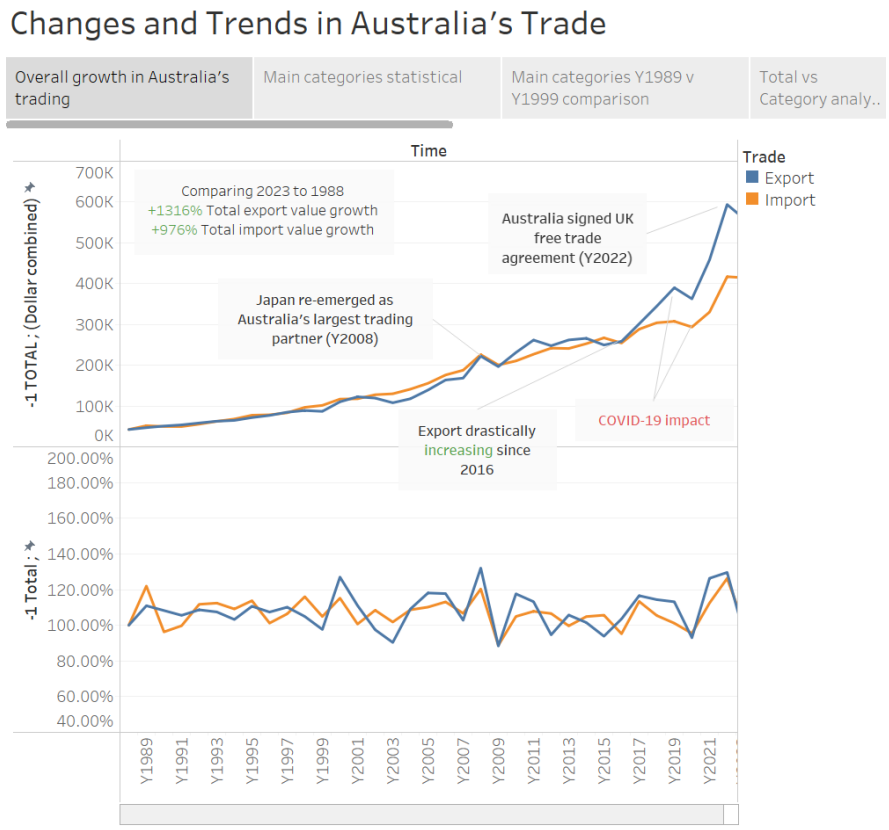

Figure 13 Line graph of Australia's trading

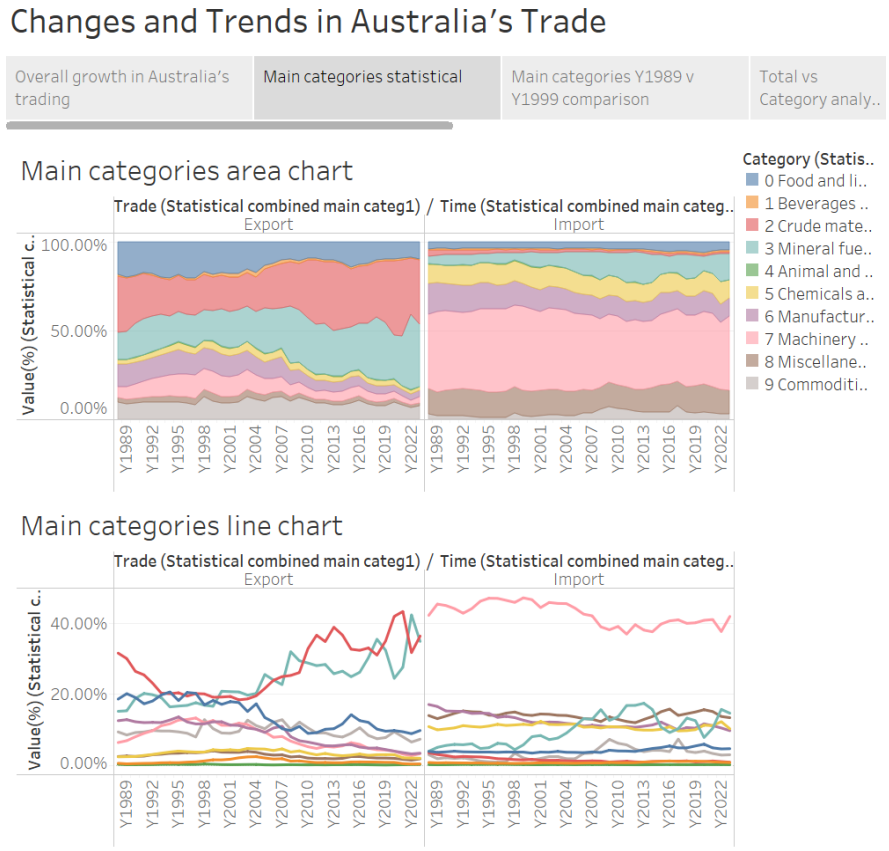

Figure 14 Main categories statistical

The storyboard for this report consists of 7 story points, first talking about the overall total growth of Australia's trading, and then the categories, and further on the subcategories, and even reaches the yearly breakdown of that specific subcategory. In this report, the focus would mainly be on main category 0, Food and live animals.

7.1 Story #1 - Overall growth in Australia's trading

The first story (*Figure* 13) tells about the general situation of Australia's trading from the year 1988-2023. As can be seen there has been a steady increase in both export and import, with an increase of as much as 1316% and 976% dollar values when comparing 2023 to 1988.

There is a noticeable spike in 2008 in both dollar graph and analytical graph, this was when Japan re-emerged as Australia's largest trading partner, surpassing China.

Export, especially, had a drastic increase since 2016. Although, it also declined briefly in 2020 due to the impact of Covid-19.

Afterwards the number continued to soar and reached an all-time high of

around 590,000 million in 2022, which can also be seen in the spike in the analytical graph which increased to 130%.

7.2 Story #2 – Changes and Trend in Australia's Trade

This second story (*Figure 14*) shows the analytical breakdown of the main categories throughout the years. This is displayed in an area chart and a line chart and separated into columns by the trade type of export and import. Further explanation on this graph can be found in Section 5.3 and Section 5.4.

7.3 Story #3 – Main categories Y1989 vs Y1999 comparison

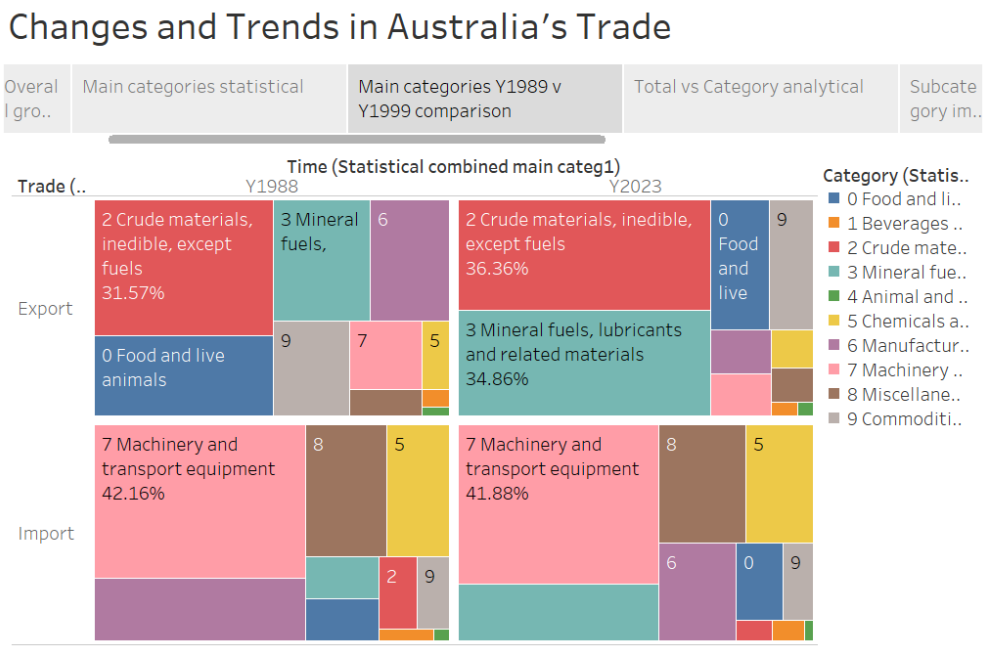

Figure 15 Main category Y1989 vs Y1999

The third story *(Figure 15*) displays a Treemap comparison of the main categories in the first recorded year 1988, and the last recorded year, 2023. This graph was also further broken down by the trading type export and import. As can be seen from the figure, there is a shift in the ratio of the main categories. For both export and import, the number one source of trade stayed the same in the beginning and last recorded years, with only slight changes in value. For export the subcategory that contributed the most was category 2 Crude materials, inedible, except fuels, which was 31.57 in 1988 and increased to 36.36% in 2023. On the other hand, for import the subcategory that contributed the most was category 7 Machinery and transport equipment, the value was 42.16% in 1988 and slightly declined to 41.88% in 2023.

In terms of category 0 Food and live animals, in the beginning they were the second highest contributor of Australia's export, as much as 18.66%. Following that was category 3 Mineral fuels, lubricants and related materials, which totals the 15.24%. The contribution of this two category, however, switched throughout the years, making category 3 the second highest contributor with 34.86% and category 0 the third highest with 9.85%.

7.4 Story #4 – Total vs Category analytical comparison

The fourth story (*Figure 16*) shows the analytical value of export and import in line graphs. The top line graph displays the total analytical value, while the second line graph displays the category analytical value. For the second graph there is a category filter in which we set to 0 (as it is the category we will be highlighting in this report). Note that the trade type is used to set the colour of the lines in the chart.

As can be seen from the figure, they mostly follow the same pattern of fluctuations, which means the values of the category are heavily correlated with the total value. In 2003, there is a noticeable export decrease in both the total analytical value and analytical value for category 0. There was, however,

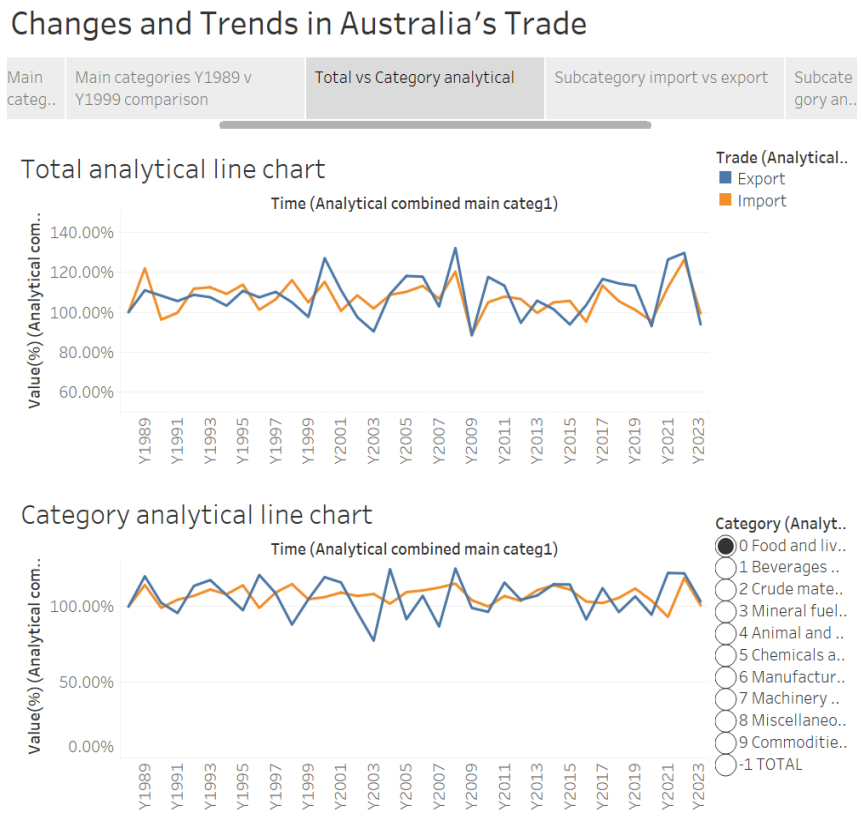

Figure 16 Analytical total vs category

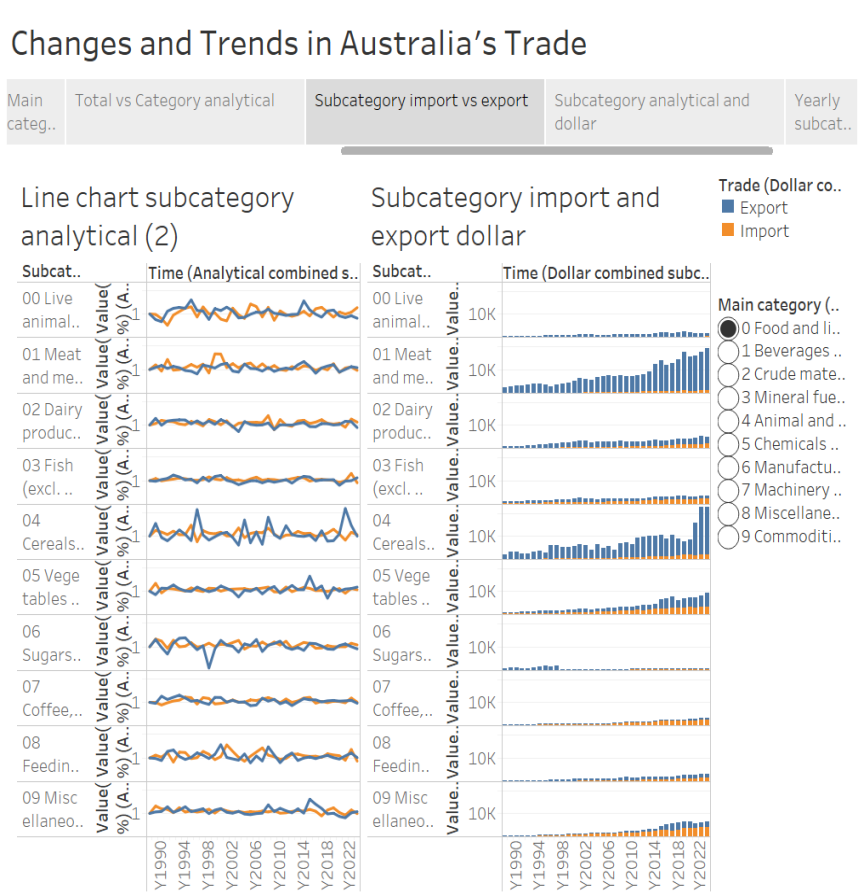

Figure 17 Subcategory import vs export

also an export increase in the analytical value in the year 2000, 2008, and 2022, which can be seen from the spike in both graphs. This further shows that the category 0 food and live animals heavily impacts the Australian trading scene. An example is the increase of export of food and live animals in the year 2000 as much as 120%. Similarly, the total export value for the same year increased to 127%.

7.5 Story #5 – Subcategory import vs export

In the fifth story *(Figure 17)* we focus on the particular main category breakdown of the subcategories.

This story uses a line chart on the analytical value (left side) and a column/bar chart on the dollar value (right side) and also utilizes the trade type for colours. The year acts as the column while the subcategories further divide the rows into several more charts. In this story the main category again is used as a filter.

The figure shows that there has been several spikes of increase in the export of the subcategory cereals. Conversely, there was a significant drop of sugar export in 1998.

The dollar chart also shows that the subcategory meat and cereals generated the highest number of exports.

7.6 Story #6 - Subcategory import vs export (2)

Next, the sixth story (*Figure 18*, *19*) shows further detail on the subcategories statistical and dollar data. Similar to earlier, the main category is there as a filter, and additionally, a trade filter is also presented so that the focus can either be on export (*Figure 18*) or import (*Figure 19*). On the top, there is a packed bubble chart with colours to denote the subcategory and the dollar value for the bubble size. Additionally, the time/year attribute is used to separate the bubble into more detail. Conversely, on the bottom, there is a line chart with the year acting as in the x axis and the statistical value in the y axis.

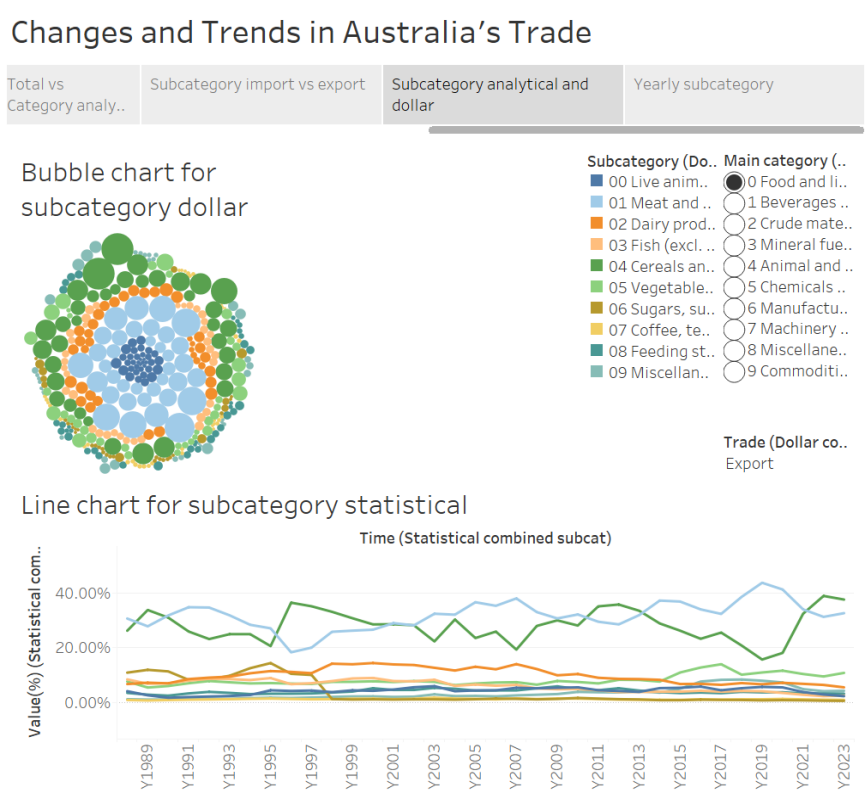

Figure 18 Subcategory - export

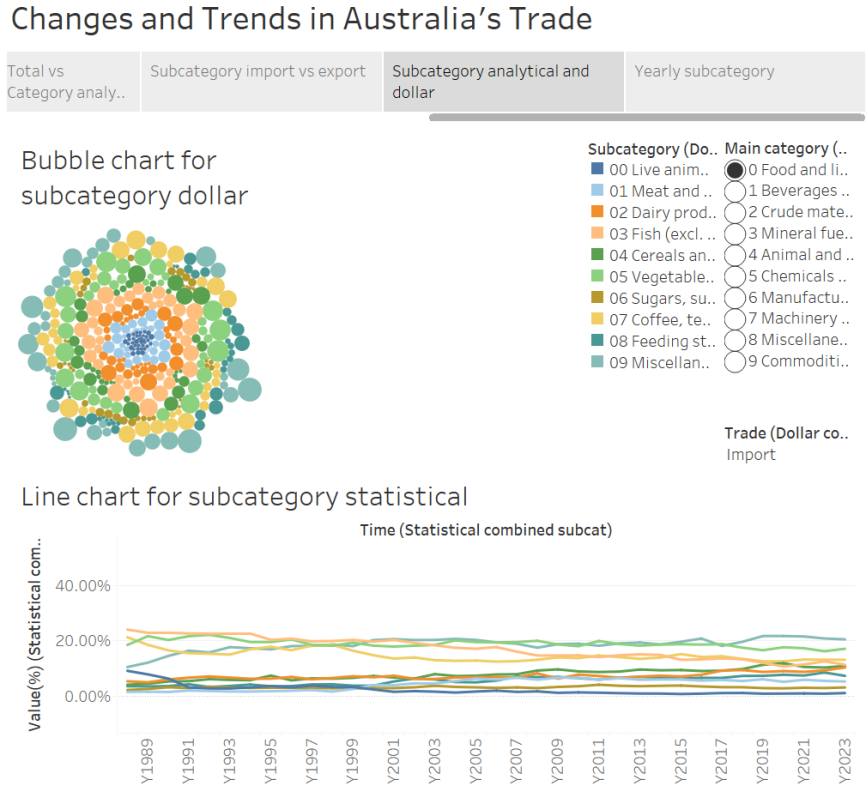

Figure 19 Subcategory - import

From *Figure 18*, we can see that the highest number of exports in the category food and live animals are either from meat or cereal products. These two subcategories have shifted throughout the years in placing as the first or second contributor. They account for around 20% or more each, in comparison to the other subcategories.

From Figure 19, we can see that the highest number of imports in the same category originally comes from fish products followed by coffee, tea, cocoa, and spices. In around 1998-2000, however, these two subcategories were overpassed by the subcategory miscellaneous edible products, and vegetables and fruits.

7.7 Story #7 – Subcategory yearly detail

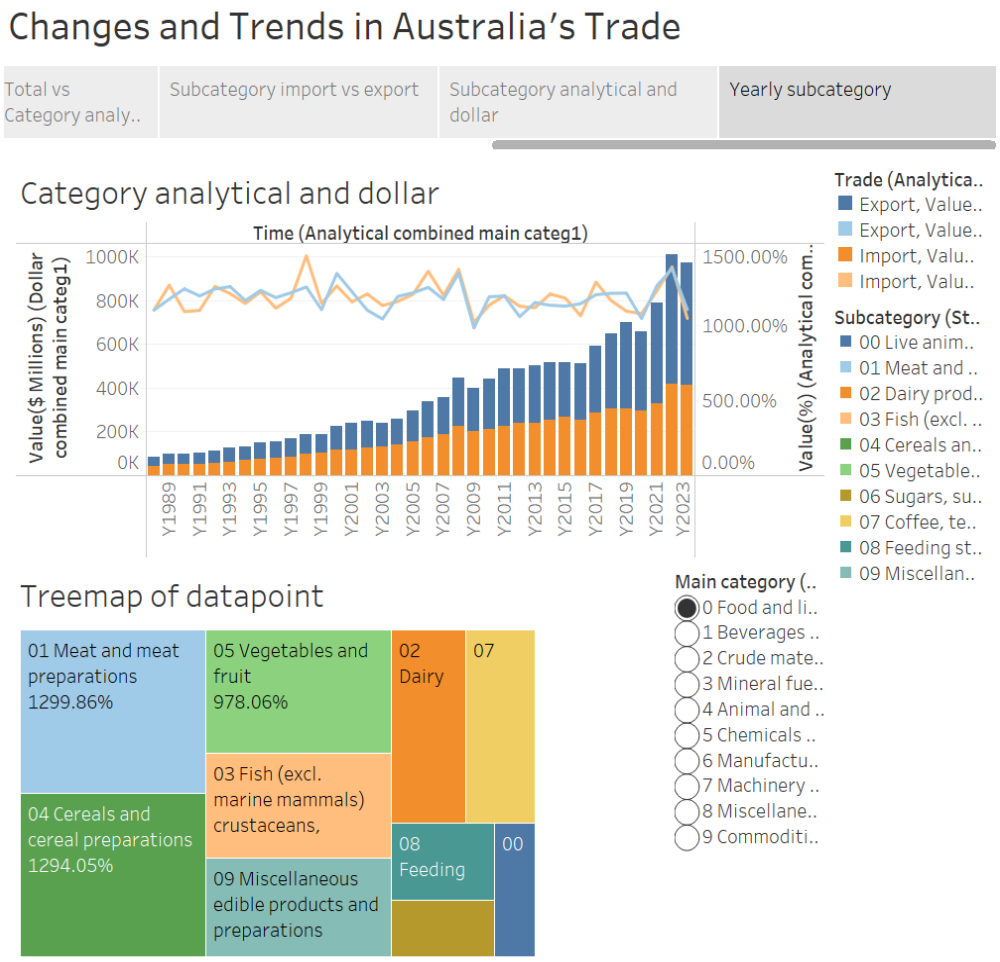

Figure 20 Yearly subcategory

In this last story (*Figure 20*) there are two graphs with one visible filter for main category.

The top graph is a combo chart of a line graph that shows the analytical value of the chosen category along with a stacked column of the dollar value of the chosen category. The marking for this graph is using colour to express the trade type. In addition to providing visualization of the category value throughout the years, this graph also serves as a filter for the bottom chart. How this work is by selecting a data point in the graph, e.g. the year 2023 import part of the bar; the bottom chart will use the trade type and year value from this (export and 2023) as a filter. Hence, the bottom chart is a Treemap that shows the subcategory breakdown from the chosen main category on the specific year and either trade types.

8. Summary of Advantages

8.1 Advantages of Dashboards

Dashboards offer a visually engaging and intuitive representation of complex datasets through the use of charts, graphs, and other visual tools, making information easier to understand. Interactive Tableau dashboards allow users to explore data dynamically, gaining deeper insights through features like filters, parameters, highlight actions, and color coding. Real-time data is continuously updated on these dashboards, which is essential for making decisions based on the most recent knowledge. They combine data of different kinds and formats, giving users a variety of viewpoints and improving comprehension amongst various business divisions. One important feature is customization, which lets users make dashboards according to their own requirements and preferences for various audiences. Tableau dashboards help decision-makers make more informed and efficient decisions by giving them a thorough overview of important metrics and KPIs. This allows decision-makers to quickly

spot trends, patterns, and outliers. Furthermore, dashboards' storytelling features enable users to arrange visualizations in a logical order to create a narrative that effectively communicates insights and findings.

8.2 Advantages of Storyboards

Storyboards craft a cohesive narrative about datasets related to Australian International Trade. They present information in a seamless and organized way for stakeholders or viewers by showcasing dashboard visualizations in order. Annotations, text, markers, and visualizations are applied to storyboards to apply contextual understanding, which helps traders communicate important insights. By comparing data trends, interactive elements improve storytelling by enabling users to toggle filters, creating dynamic and captivating charts. Storyboard design provides a polished, eye-catching presentation mode with an adjustable user interface. Given that stakeholders have a variety of needs and interests, adaptability depends on the presentation of important information to different audiences. Clickable arrows that smoothly transition between dashboards guarantee a fluid presentation, avoiding information overload and assisting with insight retention. Storyboards are also valuable for educational purposes, breaking down complex concepts, processes, or data trends into digestible parts for better comprehension.

9. Conclusion

The interactive Tableau worksheets, dashboards, and storyboard have provided valuable insights into the economic changes in Australia's internal trade from 1988 to 2022. The underlying trends and breakdown of Category 0 Food and Animals reveal a decline in export revenue, particularly due to Fish and crustaceans, Sugars, Vegetable and animal oils, and coffee, tea. High-investment opportunities for exports and imports are identified in Meats, Cereal, and Miscellaneous edibles, due to their projected international market growth. Additionally, post-COVID-19 international trade, bolstered by global free trade agreements, is yielding record profits. Among the main categories, the leading industry for Australian exports is in crude materials, while imports are dominated by machinery and transport materials.