

# Assessment 3



32146 - Data Visualization and Visual Analytics

## Australian International Trade



Somesh  
Shanbhag

25525837



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# 1. Introduction

Australia's international trade propels the majority of the country's economy by exporting and importing goods in and out of the nation. Australia has imported and exported thousands of goods from 1988 to the current date of this report from raw metal such as iron and steel to finished goods. This report uses 1988–2024 trade data to look at the major trends and changes over the years. Numbers are sourced from Australian Bureau of Statistics imports and exports and presented in the form of three Excel spreadsheets: one with raw dollar amounts, one with analytical trends (year-over-year growth), and one with statistical trends (year-over-year percentages against the prior year). We use these to see how big goods categories have changed over time and what drove the change.

## 2. Dataset Summary

The data includes volumes of imports and exports for 37 years from 1988 to 2024. The data is provided in a single Excel spreadsheet with three main sheets. The same key variables like years, flow direction (exporting or importing), ten broad categories, and 67 detailed sub-categories, appear in each of the sheets but the way the numbers are organized is different to enable different types of analysis.

### 2.1 Raw Dollar Values Sheet

This spreadsheet has one line by direction of trade (export or import) and by year. There is one column per main category (e.g., Chemical and related goods) or sub-category (e.g., Medicinal and pharmaceutical preparation). The last column is the sum of all categories so that the user can see their total. The raw data enable us to see the scale of the trade over the years. For example, Petrol and related preparations in Mineral fuels rose from a few hundred million in the 1990s to tens of billions in the 2000s.

### 2.2 Analytical Patterns Sheet

Here the emphasis is on percentage change from year to year. All the cells indicate how much a category increased or contracted in relation to the last year. Figures above 100 percent indicate increase, and figures below 100 percent indicate decrease. There is a "DIV/0!" where there was no trade last period. This sheet highlights turning points. For instance, crude oil exports soared by more than 200 percent in 2008, both as a result of price spikes and new capacity.

## 2.3 Statistical Share Sheet

The table converts the absolute figures to the proportion of total trade in that particular year. The cell in each one has the proportion of the total of the period and direction of trade. The import mode adds up to 100 percent, as well as the export mode. The shares reflect structural change. Manufactured goods as a proportion of total export rose from the level of 10 percent in 1988 to over 30 percent in the year 2024, reflecting the transition away from the export of resources to higher value-added commodities.

Main Categories Overview Ten main headings from "Food and live animals" (Category 0) to "Machinery and transport equipment" (Category 7) to "Commodities not classified elsewhere" (Category 9) are detailed. The statistics indicate how the combination of Australian exports changed dramatically. Agriculture and food dominated in the late 1980s, but minerals and fuel dominated in the mid-1990s. Manufactured goods then boomed from 2000, assisted in part by rising demand for manufacturing equipment and supplies.

## 2.4 Subcategory Features

There are numerous sub-divisions under each major category. Category 6 (Material-manufactured goods), for example, includes Leather (61), Paper and paperboard (64), Iron and steel (67), and so forth. Some of the sub-divisions act in a manner quite different from the others. Iron and steel imports more than tripled from 1988 to 2008, while exports of paper products trended steadily but at a more gradual pace. The spreadsheet functionality gives the option of drilling down from the broad trends at the sector-level to particular product lines' performances.

## 2.5 Import and Export Trends

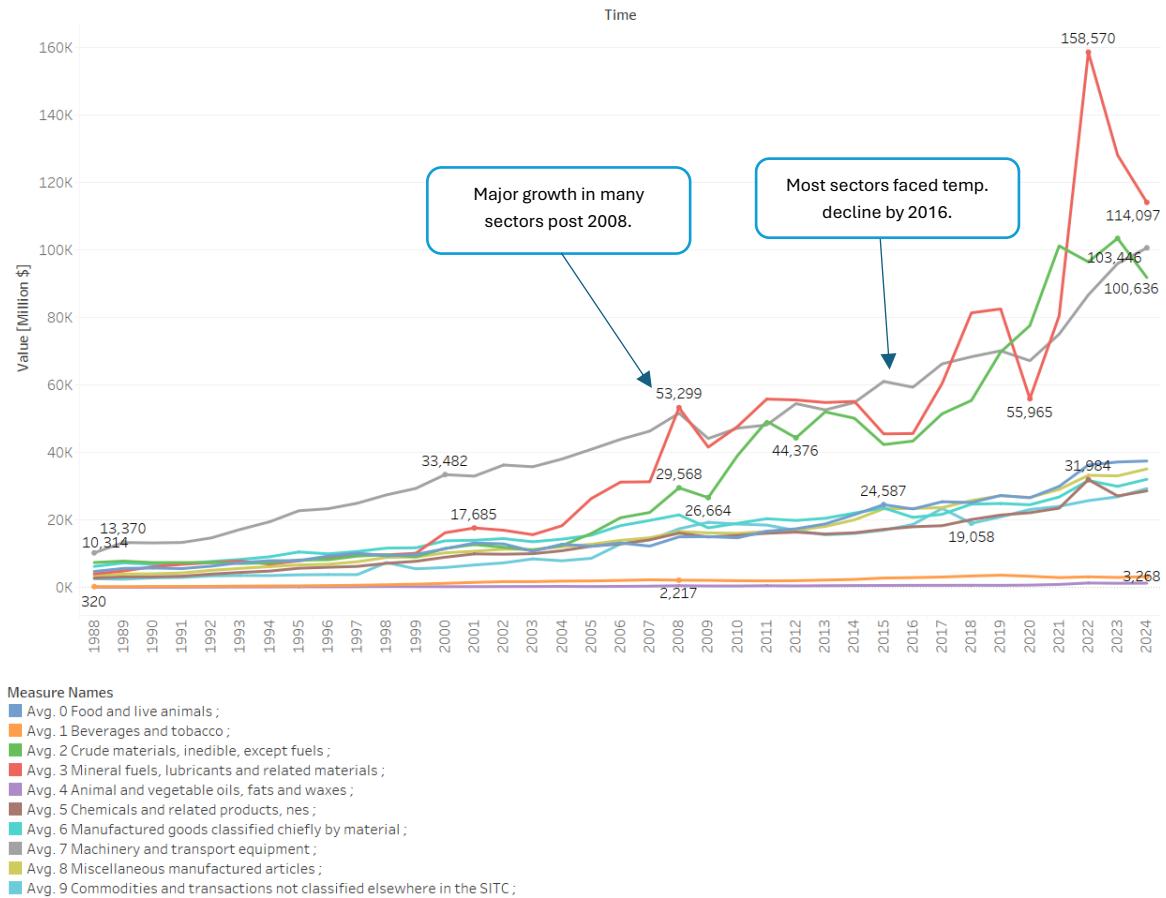
Historically, Import lines and export lines both span a block of rows, allowing comparison to be simple. Mineral-fuel exports rise in the 2000s and plateau off in 2012. Manufactured goods imports increase steadily, a sign of dependence on foreign input via machine and construction imports. Looking in both raw dollars and in statistical shares, we can observe that some categories rose in raw value but fell in share, which suggests that other categories rose that much more rapidly. Data Preparation and Quality The three sheets have the same structure of 37 years by around 70 columns of categories. The totals in every year are cross-checked to equal the total of the sub-categories. The Excel spreadsheet was cut from ABS statistics and minimally cleaned to eliminate header repetitions and normalize the layout. There are no noticeable breaks in any of the time series, and zero-trade years are indicated explicitly with DIV/0! in the analytical sheet. Taken together, these three viewpoints, dollar size in its raw form, growth rates and changes therein, and relative shares, provide a rich model. The analyst can pick the viewpoint most suited to his/her question of analysis,

whether comparison of size, growth patterns, or structural importance of each merchandising category.

## 3. Visualization and Insights

### 3.1 Main Category Trends and Insights (Raw Dollar)

Trends By Main Category - R



## Trends By Main Category - R (2)

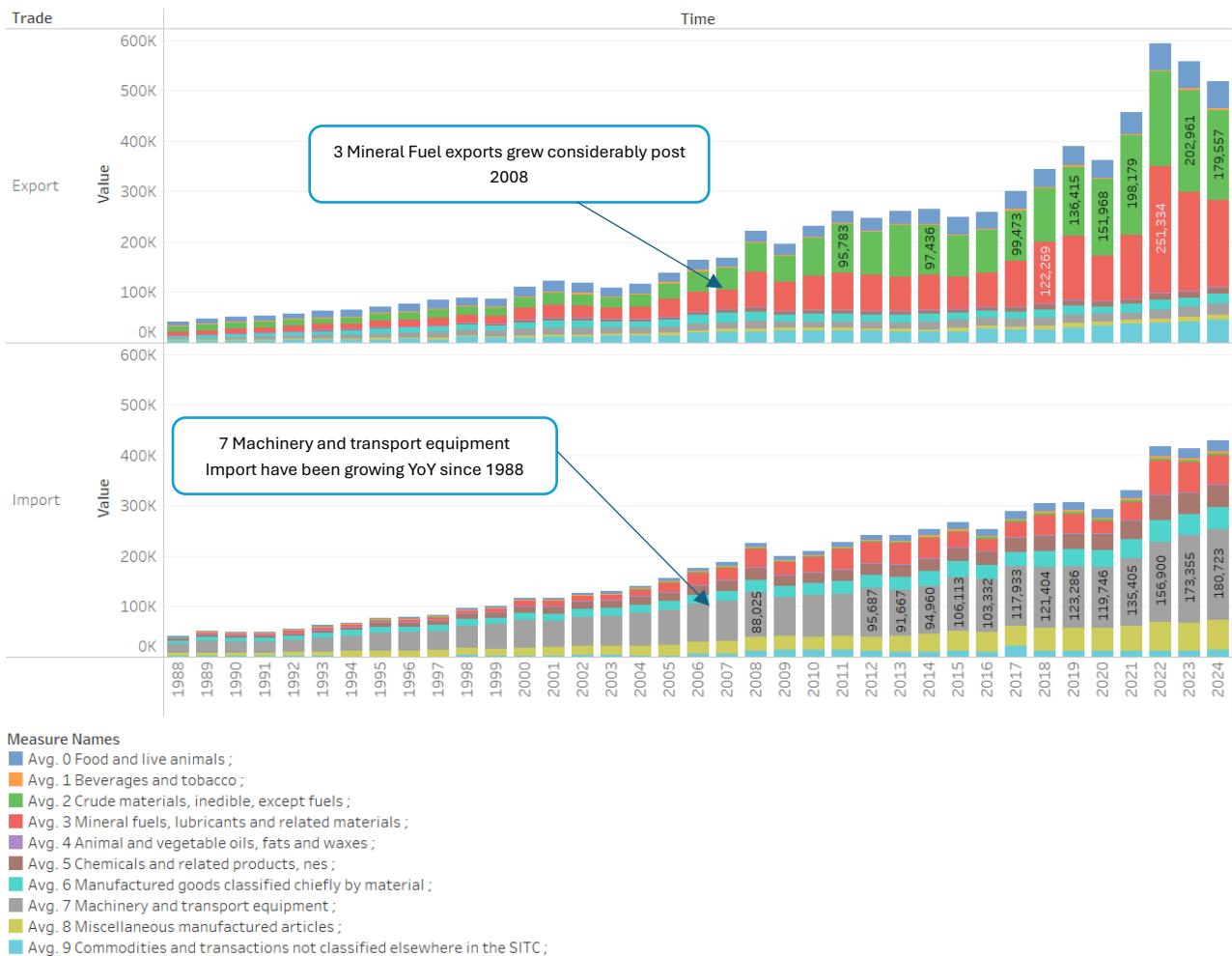


Figure 1: Trends in Main Category

### 3.1.1 Chart Explanation

Two charts are used to give the full picture of trade trends. The line chart shows that changing dollar values of trade categories between years from 1988 to 2024 change the way it is indicated. The years are represented on the x axis and the trade values on the y axis in Millions. Each colored line represents a specific trade category such as food and live animals, beverages and tobacco, crude materials, mineral fuels, animal and vegetable oils, chemicals, manufactured goods, machinery and transport equipment, miscellaneous manufactured articles and other commodities. The stacked column chart, on the other hand, reveals both imports and exports in one observation. Here, the x axis also reveals the years while the y axis reveals the total trade value. Each column contains segments showing the value of imports and exports for each category. Together, these graphs give an overall view of how trade values vary over time and highlight the import and export contribution in each category while also at a glace comparing all the main category variations as well.

### 3.2.2 Summary Insights

From both the charts, it can be seen that mineral fuels are the most exported category from 2008 onwards because it holds a very high value with many fluctuations as well as a steep peak followed by a decline. Machinery and transport equipment become the most imported category with an ever-increasing trend and high values. Food and live animals and beverages and tobacco are steadier and record minimal increases year on year. The year 2008 is a turning point for many sectors. The column chart also indicates that the commodities section is the lowest imported category because it has extremely low trade values. Further, manufactured products and machines have lower fluctuations and exhibit steady growth and a consistent market. The sector with the most decline after a peak is mineral fuels, indicating that there must have been some outside influences on its trade throughout the years. This combined perspective aids us in determining which sectors are dominating in exports, which sectors are increasing in imports, and where there are market changes.

## 3.2 Main Category Trends and Insights (Analytical)

Trends By Main Category - A

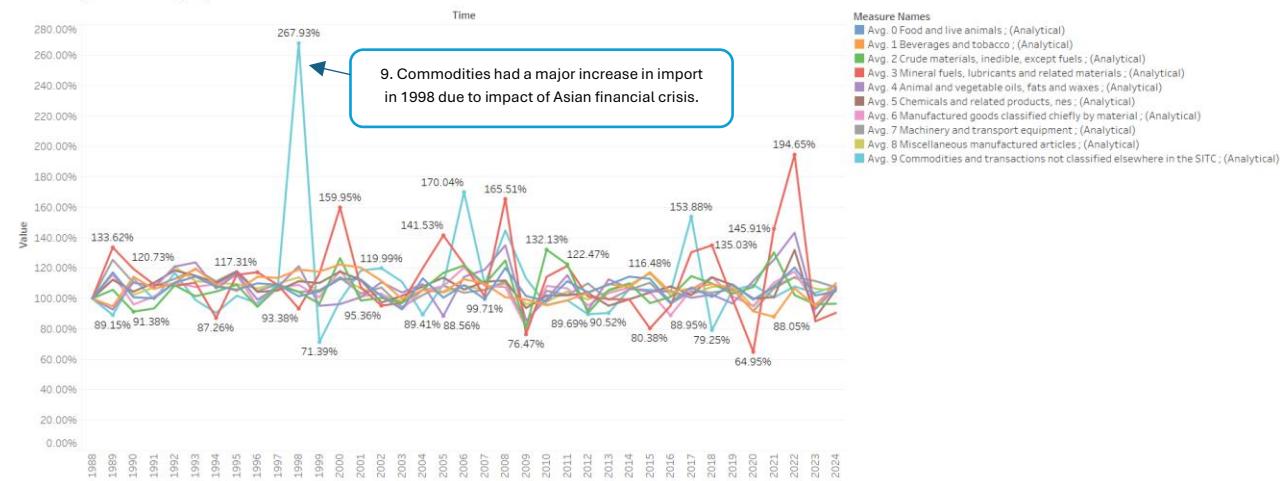


Figure 2: Main Category Trends and Insights(Analytical)

### 3.2.1 Chart Explanation

This was done using an analytical chart in Tableau and it is present as a line chart showing the year-to-year percentage variation of Australia's main trade categories from 1988 through to 2024. The x axis is made up of years as a time reference while the y axis shows each category's variation from the previous year as a percentage. This means any reading above 100 explains that trade increased compared to last year and any reading below 100 shows that trade decreased compared to the previous year. The graph uses a calculated field within Tableau to convert the raw trade values into percentage change, and where there is no last

year data the graph displays a DIV/0 error. Turning points in the key are marked with annotations; for example, one marks a dramatic 267 percent increase in 1988, and another states that crude oil exports increased by 165.51 percent in 2008, an important observation though less than the 200 percent rate often cited. These notes help identify the viewer's focus on significant changes caused by events like market liberalisation, price spikes, or movements in production capacity.

### 3.2.2 Summary Findings

The chart strongly shows through the illustration of yearly percentage variations in Australia's trading industries. Mineral fuels are the most consistently volatile group with extreme fluctuations follow-up spurt in 2008 establishes that crude oil exports went up by a whopping 165.51 percent, showing the group's sensitivity to the external market. Manufactured goods record a steady increase, showing continuous growth and showing the sector to be the most imported. Machinery and transport equipment also show steady improvements, reflecting a stable industrial market. In contrast, other segments such as food and live animals and beverages and tobacco are more stable, with marginal increases or decreases over the years. Other segments such as crude materials, animal and vegetable oils, chemicals, and miscellaneous manufactured articles have moderate movements with variable market conditions and external influences at work. Overall, this analytical view effectively shows the industries that are expanding and contracting in a bid to understand the proportionate influences on Australia's trade over time. The peak is greatest in Group 9 commodities, which include commodities and transactions not otherwise classified in the Standard International Trade Classification (SITC). These commodities would generally include special transactions, confidential in nature, trade items, and non-monetary gold. The sharp increase in this group could be due to an increase in gold exports, one massive one-time transaction, or a policy change that affected the way some goods were categorized. In some cases, this category has peaks when reporting practice changes materially or when good things such as precious metal or precision equipment are auctioned in bulk. For the most stable categories, such as food and animals, beverages and tobacco, and chemicals, these tend to have the most stable trends over time periods. These categories tend to have little percentage fluctuations year to year because they are essentials with steady demand. Consumables and beverages, for example, have steady demand and never fluctuate their value in commerce significantly. Chemicals also tend to be constant in their trend, likely due to their application in industry and in medicine, which have steady demand. These types are considerably different from miscellaneous manufactured items and mineral fuels, which have much higher swings influenced by external market forces and changing consumer demand. This analysis illustrates how individual trade categories trend during a span of time, some showing wide highs and lows and others showing a consistent trend.

### 3.3 Main Category Trends and Insights (Statistical)

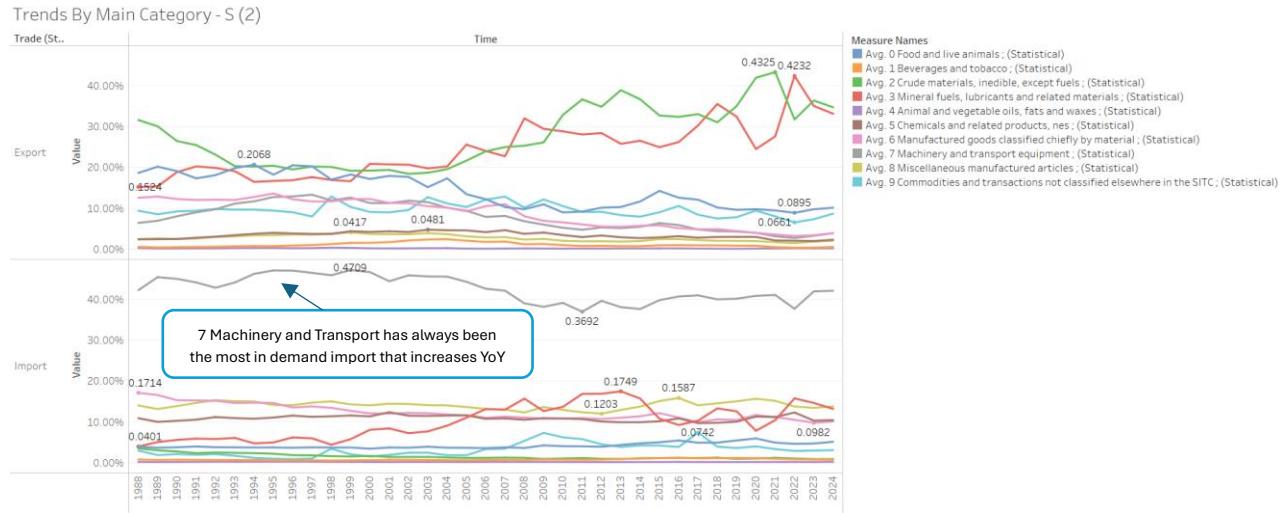


Figure 3: Main Category Trends and Insights (Statistical)

#### 3.3.1 Chart Explanation

This line chart titled, "Trends by main category S (2)," indicates a number of data series plotted over an extended period of time. Along the horizontal (x) axis, the time runs from 1988 through 2024, indicating the development of each category through the years. The y (vertical) axis quantifies values in terms of percentages, ranging from 0% to 30% so that the audience is able to visualize the magnitude of the performance of each category. Each line on the graph embodies a variant main category and is visually distinguished by its respective color with a legend provided on the right-hand side to facilitate identification. Annotations on the graph highlight significant data points such as prominent peaks and troughs thereby pushing moments of exceptional performance or slump into the light. For the purposes of clarity, the axes have been neatly edited, gridlines run across the graph to make it easier to track changes accurately, and the labels are clearly marked. This intentional design not only allows trends to be read more easily but also allows intuitive understanding of subtle variations throughout the years.

#### 3.3.2 Summary Insights

The statistical graph translates raw trade data into normalized percentages, import and export modes each adding up to 100%. Normalization effectively cancels trade volume differences so that it is possible to make a comparative, statistically valid analysis of structural change over time. In exports, the output shows manufactured goods have registered a statistically significant positive trend. The proportion of manufactured exports, increasing from about 10% in 1988 to over 30% in 2024, is one of the major shifts in the central tendency of trade composition. This is not merely a statistical fluctuation, it is a sign

of a structural realignment, with a stunning shift towards higher value-added products. On the other hand, the traditional resource-based export categories have suffered market share decline, which means their relative share has decreased over time as reflected by the analysis. On the side of import, varying degrees of dispersion are evident. Some categories are less variable, statistically meaning more stable demand, than others which exhibit more variability and refer to market trends which might be susceptible to cyclical trends or shocks. These statistical outputs provide a robust basis for understanding which sectors are driving change and highlight areas where policy interventions could leverage emerging trade patterns.

### 3.4 Sub Category Trends and Insights (Raw Dollar)

Trends By Sub Category 6 - R (2)

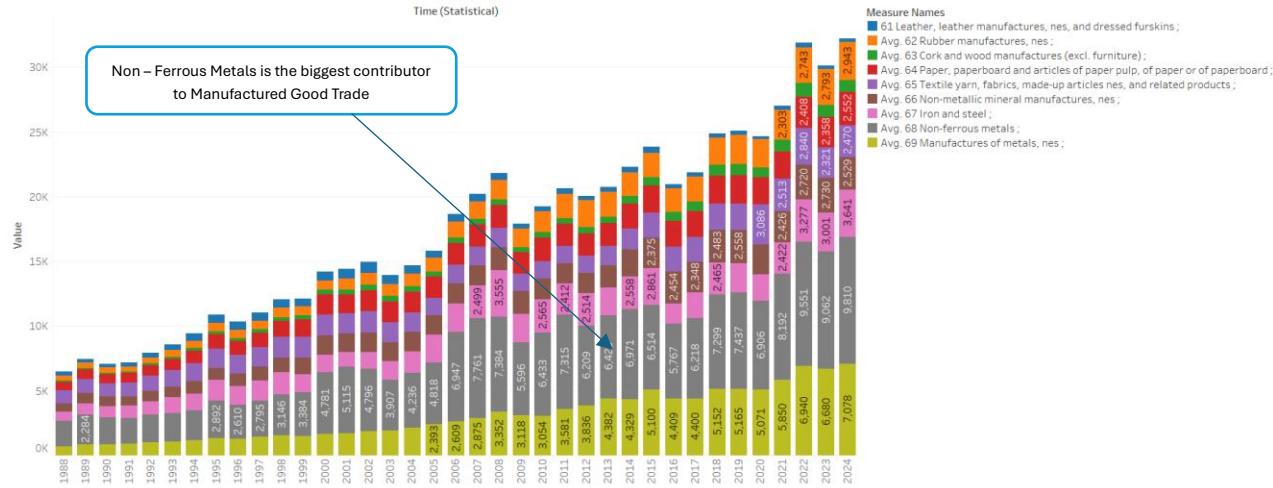


Figure 4: Subcategory Trends and Insights (Raw Dollar)

#### 3.4.1 Chart Explanation

The following figure is a stacked bar chart and line chart in Tableau, titled "Trends by Sub Category 6 – R (2)". The figure illustrates raw dollar value trends in Australia's trade in Category 6 – "Manufactured Goods Classified Chiefly by Material" – across a time series of 1988 to 2024. The x-axis presents the timeline in years and the y-axis the total trade value in millions of AUD. Each vertical bar is for a specific year, and within each bar, different colored segments are employed to portray different sub-categories (coded between 61 and 69). The sub-categories include Leather (61), Rubber (62), Cork and Wood (63), Paper (64), Textiles (65), Non-metallic Mineral Products

annotated with summed or average values (e.g., "2,743" or "3,001"), which contribute to the readability of the graphic without requiring interactive tooltips. The chart's color coding, which is managed by the "Measure Names" and "Marks" cards, is good at discriminating between categories. For the purposes of readability, the y-axis has been labeled with rounded tick marks at regular intervals (i.e., 5K, 10K, 15K), making the general trend more readable at a glance. This graph is particularly useful to identify which sub-categories have increased, plateaued, or fluctuated over the decades, offering both macro- and micro-level data on trade flows.

### 3.4.2 Summary Insights

This statistical graph shows raw dollar values of trade in Category 6 – Manufactured Goods Classified Chiefly by Material, showing long-term trends between 1988 and 2024. Since the data are presented in absolute terms, they rightly show the actual economic weight each sub-category carries over time, enabling one to measure not only growth but also contribution to the aggregate. General trend of Category 6 is one of steady and considerable increase in total value of trade, especially post-mid-1990s, with even more dramatic increases post-2016. The few huge sub-categories are responsible for variation in total value as portrayed by the stacked bar graph, with others making negligible or constant contributions.

Sub-category 69 – Other Articles of Manufacture is the largest and fastest-growing contributor over the last few years. Its strong rising pattern starting from 2016 has contributed significantly to lifting overall Category 6 values, as seen from the high rise between 2020 and 2024. The sub-category alone accounts for a great deal of growth over the last few years in the top category and is a significant reason for the total's volatility over these years. Sub-category 67 – Iron and Steel also contributes richly to the general total, particularly during the initial years of the 2000s when it saw an upsurge in trade value. While its growth has now peaked, its high and stable base level continues to account for a large share of the general total and therefore adds stability rather than volatility in recent years. Sub-category 64 – Paper and Paperboard and Sub-category 66 – Non-Metallic Mineral Products are both equally mid-influential to trace the trend of the principal category, with both a steady upward slope and to contribute towards the consistent increase in the overall value. Sub-category 68 – Non-Ferrous Metals has contributed significantly to short-term volatility in the overall chart. Its year-on-year trade value has immense fluctuation, so it has been the source of some of the apparent anomalies in the total Category 6 line, most notably in years like 2008, 2012, and 2021. Sub-category 65 – Textile Yarn and Fabrics has followed a smooth and linear trend over time, contributing to stability in the overall trend with minimal disruption.

At the lower end of the range, Sub-category 61 – Leather and Sub-category 62 – Rubber have had negligible impact on the overall total due to their low absolute levels and trend levels. They have no contribution towards total change. Sub-category 63 – Cork and Wood is the most insignificantly when it comes to percent contribution and comprises a traditionally small percentage of the whole trade with hardly any fluctuation over time, thus neither contributing to nor interrupting the overall growth trend of Category 6.

Briefly, the general value trend of Category 6 is strongly influenced by only a few significant and dynamic sub-categories, Sub-category 69 and 67, primarily, while others add stability (64, 65, 66) and others remain economically on the periphery (61, 62, 63). Of which sub-categories add, helps set the overall growth of Category 6 and why certain years experienced steeper or shallower changes in total trade value.

### 3.5 Sub Category Trends and Insights (Analytical)

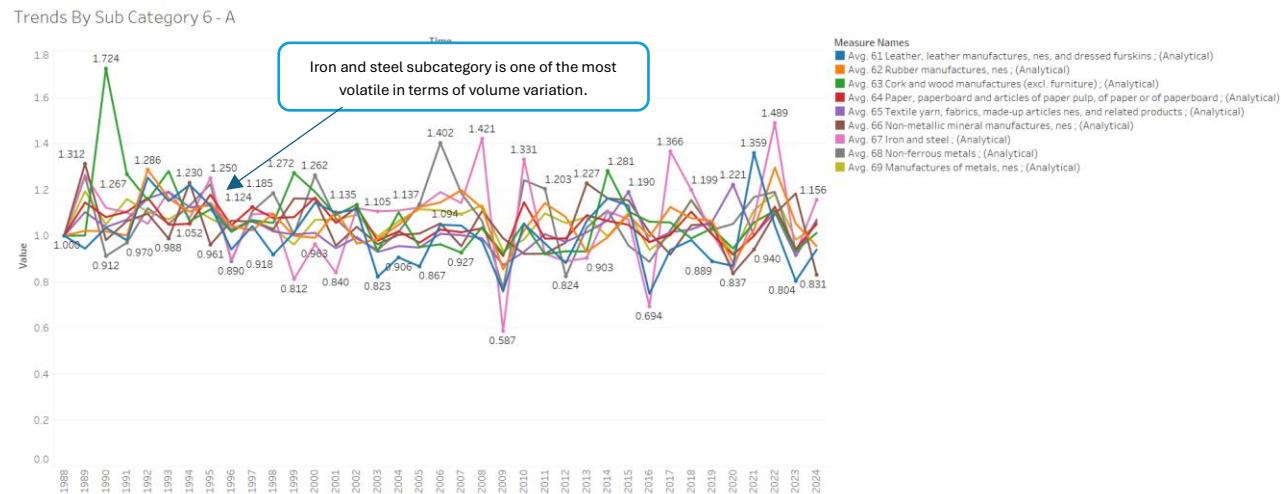


Figure 5: Sub Category Trends and Insights (Analytical)

#### 3.5.1 Chart Explanation

The chart presented is a multi-line time series plot of the normalized trade values of sub-categories of Category 6 – Manufactured Goods Classified Chiefly by Material from 1988 to 2024. X-axis is Time (Years) from 1988 to 2024, allowing viewers to observe long-term trends and short-term volatility spanning decades. Y-axis plots the normalized trade data (i.e., ratio or indexed values), which allows relative movement comparison across sub-categories despite different absolute dollar scales. A normalization base of 1.000 in 1988 is used in most categories to show their starting point. The use of variously colored lines for each sub-category (i.e., iron and steel, paper, rubber, etc.) allows for easy visual distinction. Individual data points are called out for specific years in which there are highs or lows of some significance (i.e., 1.724 for Non-Ferrous Metals in 1990 and 0.587 for Iron and Steel in 2009),

which helps to identify the more extreme peaks and troughs in performance. The chart also employs value markers on selected points to draw attention to change over time and to highlight variation. These sorts of annotations, placed directly on the graph, attract the viewer's eye to periods of exceptional growth or decline. Axis ranges have also been set slightly higher and lower than the minimum and maximum values observed to avoid line flattening and improve readability of trends. Overall, the chart is a comparative tool to observe how each sub-category of manufactured goods has fared over a 36-year period, both individually and as compared to each other.

### 3.5.2 Summary Insights

This is a trend graph founded on statistical normalization, i.e., it is interested in relative growth and fluctuation rather than in absolute trade statistics. This renders it ideal for contrasting trend performances among categories of potentially wide disparities in size since it is most appropriately geared to understand momentum, volatility, and consistency of growth. Sub-category 69 – Miscellaneous Manufactured Articles has had the most consistently increasing trend, with slow but steady growth and few sharp declines. This reflects strong and steady demand over the years and is a good Category 6 contributor. Sub-category 63 – Cork and Wood Products, meanwhile, has been the poorest performer with practically no rising trend or volatility in the recent decade. Its line is flat overall, an indication of stagnation in trade performance. Sub-category 68 – Non-Ferrous Metals is most volatile, peaking at 1.724 in 1990 and falling sharply at specific points. The wild fluctuations are an indication of vulnerability to market shocks or world commodity price fluctuations. Sub-category 65 – Textile Yarn and Fabrics is the most stable performer. It has very low fluctuation and a nearly horizontal trend line for all years, reflecting consistent but low performance without any booms or busts.

Observations of other sub-categories in a nutshell:

- Sub-category 61 – Leather: Reveals early volatility with a declining trend after 2017, reflecting lower global trade importance in recent years.
- Sub-category 62 – Rubber: Shows moderate growth with little fluctuations, indicating steady but slow-growing market.
- Sub-category 64 – Paper and Paperboard: Shows little but steady upward trend, indicating medium growth throughout the years.
- Sub-category 66 – Non-Metallic Mineral Products: Shows mid-level growth trend with some visible peaks and troughs but generally takes a steady route.
- Sub-category 67 – Iron and Steel: Experiences sharp falls, especially in 2009 and 2016, showing susceptibility to worldwide economic downturns and acting as a high-impact but volatile driver.

Briefly, the line graph allows for clear differentiation between high-growth, stable, and volatile sub-categories in Category 6. Miscellaneous Manufactured Articles and Non-Ferrous Metals are the leaders in terms of growth and volatility, respectively, whereas Cork and Wood is economically peripheral. Such an analytical viewpoint provides essential information regarding trade dynamics over time, which helps guide policymakers and businesses in tracking material-based manufacturing trade performance changes.

### 3.6 Sub Category Trends and Insights (Statistical)

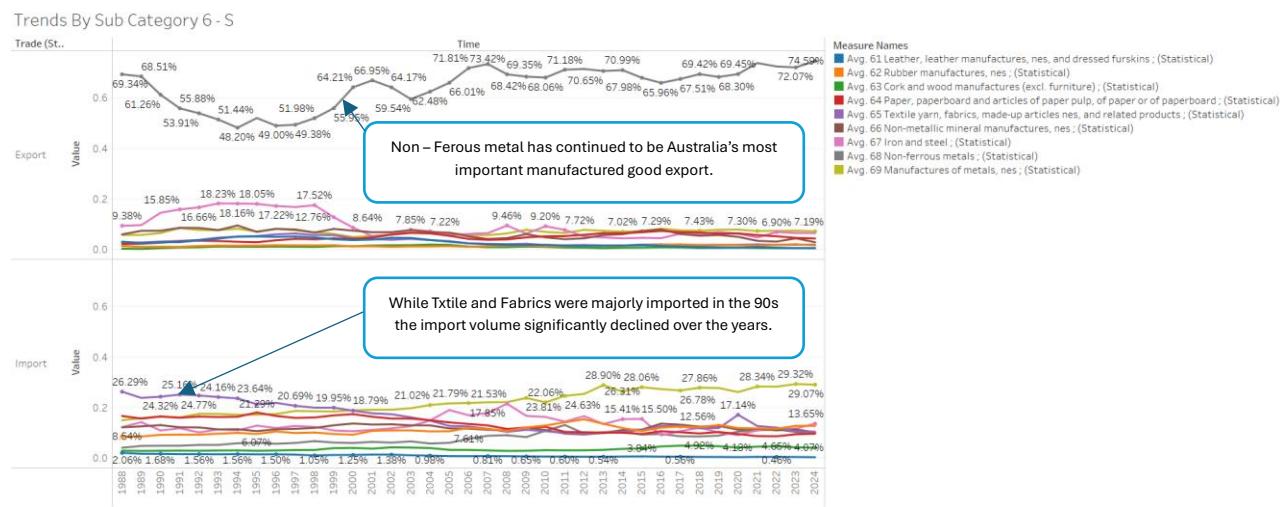


Figure 6: Sub Category Trends and Insights (Statistical)

#### 3.6.1 Chart Explanations

The chart is a two-panel time series line graph graphing the export and import proportions of some sub-categories of Category 6 – Manufactured Goods Classified Chiefly by Material, for years 1988 to 2024. The X-axis always shows the years on both panels, and the Y-axis shows each sub-category ratio of total trade proportion in decimal (i.e., 0.2 = 20%). The top panel presents export shares, and the bottom panel presents import shares. The lines in color each denote a sub-category, which is identified via a legend on the right-hand side, with interesting peaks and troughs pointed out using bold annotations (e.g., Leather's 69.34% export share in 1988 or Iron and Steel's 28.9% import share in 2013). The Y-axis has been zoomed in from its default range to more easily show variations in sub-categories with lower values, thereby enhancing visual granularity. It is now simpler in this layout to follow the evolution of changes in proportions of trade for each sub-category over time and to discern trends, volatility, and relative dominance or marginality over decades.

### 3.6.2 Summary Insights

This statistical chart tracks the proportionate share of each sub-category in total exports and imports, giving an indication of their relative importance, stability, and progression over time. Sub-category 69 – Miscellaneous Manufactured Articles registers the most consistent growth in exports, reflective of sustained demand and a growing trade presence. On the other hand, Sub-category 63 – Cork and Wood presents low and flat trends across both exports and imports, indicating low growth and trade impact. Sub-category 67 – Iron and Steel is the most unstable, with high rises and falls in both exports and imports, most notably hitting 28.9% in 2013 in imports, indicative of high sensitivity to international economic cycles and raw material prices. Sub-category 65 – Textile Yarn and Fabrics, in contrast, has a relatively constant presence in both exports and imports, with minimal change, indicating stable but modest trade contribution. Sub-category 61 – Leather was prominent early in exports (69.34% in 1988) but has since fallen significantly, indicating diminished trade significance. Sub-category 62 – Rubber exhibits minor fluctuations with low percentages throughout, suggesting a small, steady presence in the market. Sub-category 64 – Paper and Paperboard has been on the rise steadily, suggesting slow but consistent growth in its share of trade. Sub-category 66 – Non-Metallic Mineral Products is relatively stable, with minor growth in exports and stagnant import trends, maintaining a constant but small presence. Lastly, Sub-category 68 – Non-Ferrous Metals has erratic peaks and troughs, particularly in imports, implying vulnerability to price volatility and shifting demand. Overall, the chart is an effective method of communicating the shifting trade patterns of manufactured goods and is a valuable tool for identifying structural trends, policy implications, and strategic opportunities in global trade.

## 4. Trends in Manufactured Goods over Time via Dashboard

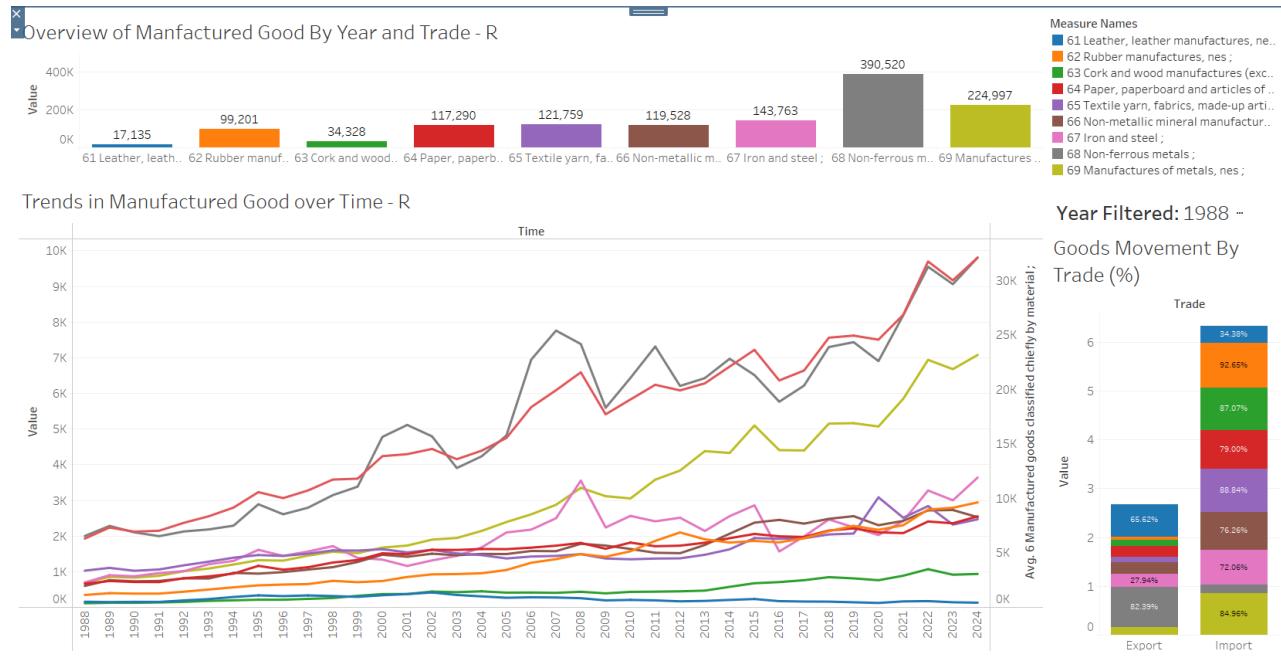
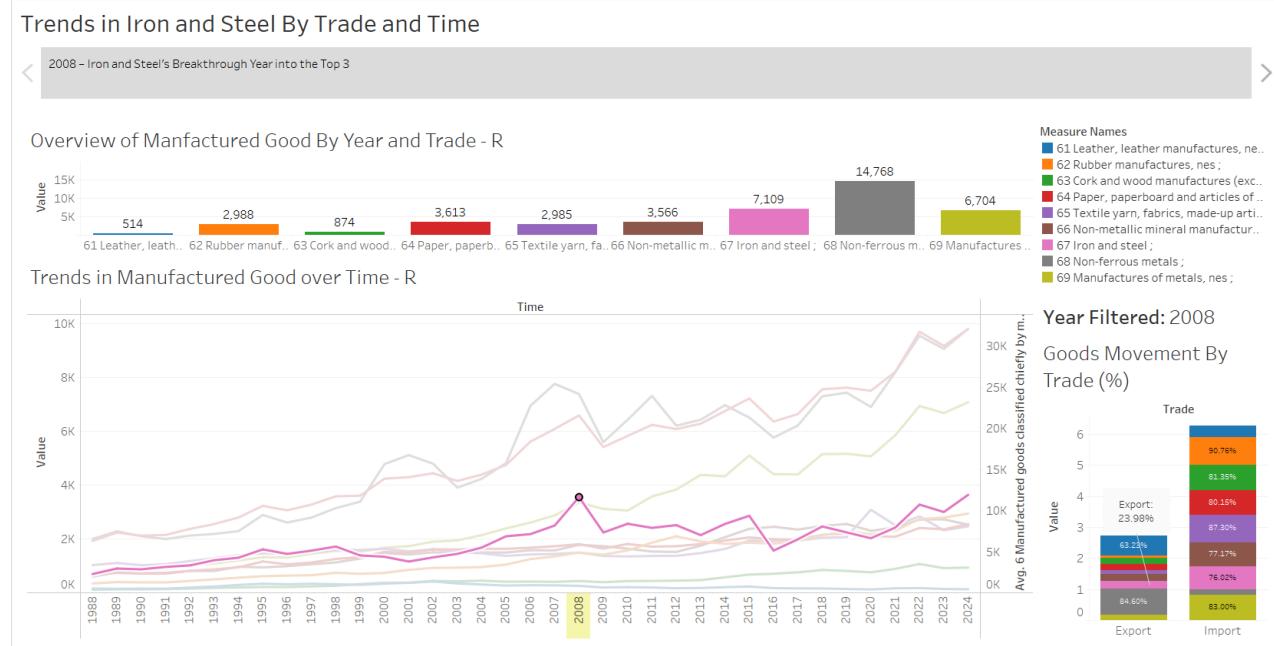


Figure 7: Dashboard dynamically filters on time to show trends and insights in Manufacturing Goods

The dashboard "Trends in Manufacturing Goods Over Time" is a clear reflection of how different manufacturing goods have developed over time in terms of imports and exports. It is made up of three simple elements: a line chart, a column chart, and a stacked column chart. The line chart is a reflection of the way different subcategories of manufacturing goods have developed over the years. It helps us contrast how each category is performing over the years. The column chart shows us the trade value (in million dollars) for each category in the year that we have selected, so we can directly compare which products had higher or lower amounts of trade within that year. The bottom stacked column graph splits the trade into percentage of exports and imports for each category and shows what percentage of the trade the category represented in the selected year. The good thing is that the dashboard is interactive. If you click on a point on the line or column graph, it filters the whole dashboard to that specific year. That permits you to quickly view what happened in any given year, i.e., which products were export dominant, which were import dominant, and how the trends changed. It permits you to discern trends, ascertain which years saw sharp change, and quickly compare among different categories. This dashboard in general permits you to quickly observe how manufacturing goods trade has changed over time and what each category contributed.

# 5. Key Insights in Trends in Manufacturing Goods

## 5.1 Story Point 1



The dashboard gives a proper depiction of Australia's drastic change in its trade patterns under Manufactured Goods Mainly Classified by Material, even more so in 2008. From the line chart, we observe the pattern of subcategories over time, where Category 67 – Iron and Steel has the largest import spike in around 2008 till date. Its growth puts it as the second-largest imported subcategory, surpassing metal producers (Category 69) for the first time. This could be observed not only from the line chart trajectory but also confirmed in the column chart, where the trade value in million dollars of Iron and Steel is only just behind that of Non-ferrous Metals (Category 68) during 2008. Concurrently, Iron and Steel exports, while increasing steadily each year, still remained less than a host of other groups, such as non-ferrous metals (Category 68) and non-metallic mineral products (Category 66). Iron and steel exports during 2008 were about \$2,235 million, a big amount though somewhat less than the sharp import hike. This distinction between export and import is indicative of a growing trade deficit in iron and steel, which speaks to Australia's reliance on imported raw materials as it grows during a period of immense building and construction.

The stacked bar chart in the dashboard supports this observation by showing each category's proportion of imports to exports. In the case of steel and iron for 2008, the import proportion was greater, about 76% imports, 24% exports, as a reflection that Australia had a

greater dependency on foreign suppliers of this particular raw material than for other categories like non-ferrous metals, which had a balanced or export-oriented trade orientation.

Compared to the broader subcategory of Manufactured Goods (Category 6), Iron and Steel constituted a good portion of the overall import value, propelling the record for overall trade volume that year. Non-ferrous metals remained the record holder for the largest trade volumes in overall category, however. Iron and Steel ranked among the top three traded subcategories in 2008, a notable shift in the ranking of Australia's manufacturing goods import order.

Overall, the dashboard makes it easier to envision this watershed for Iron and Steel. It shows how a traditionally mid-ranking subcategory soared to near the front of Australia's import list, illustrating a shift in industrial strategy and infrastructure demand, whereas export expansion trailed behind, illustrating a clear shift toward import-driven material sourcing in the Australian economy.

## 5.2 Story Point 2

Trends in Iron and Steel By Trade and Time

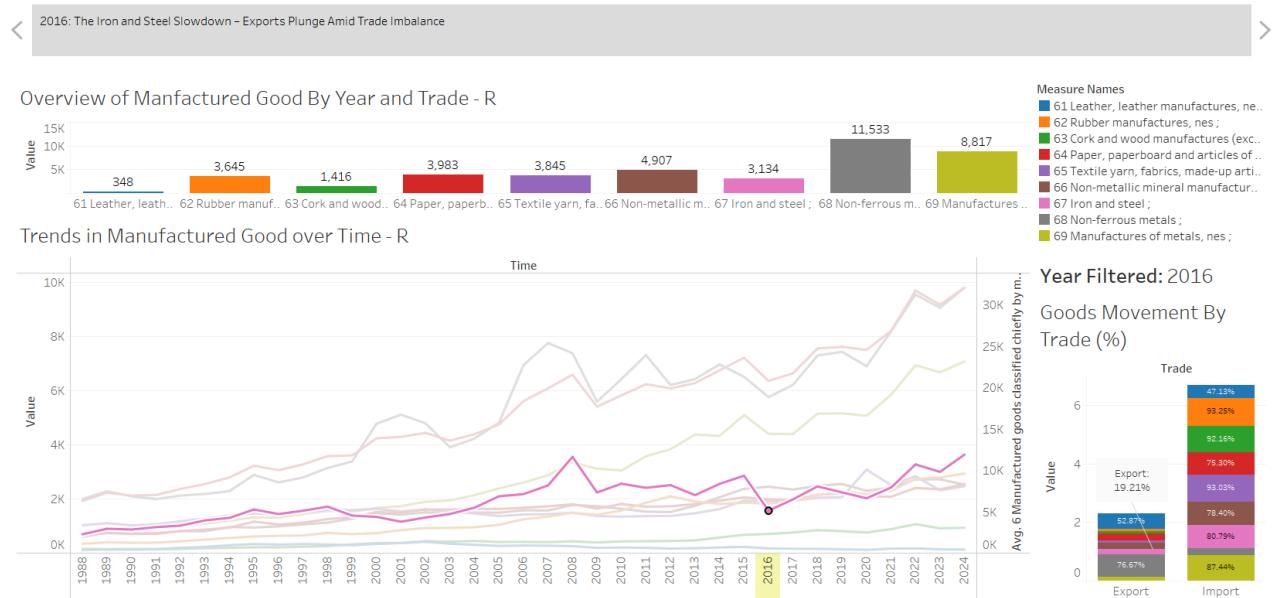


Figure 9: Story point 2 - Dashboard filtered by time and compared to other categories and Import and export trade distributions

Iron and Steel (Category 67) experienced a precipitous fall in its trade performance in 2016, one of the largest decreases in the "Manufactured Goods Mainly Classified by Material" category. According to the dashboard, exports of Iron and Steel plummeted to a mere 19.1% of its overall trade volume while its imports remained high at 80.79%, one of the most lopsided trade distributions for that year. In fact, Iron and Steel was the third worst-performing subcategory in terms of export contribution, ahead of only small subcategories with very minimal trade volume. This sort of precipitous drop in export share constitutes a major shift in Australia's trade flows and sounded alarm bells for the health of its iron and steel export industry during the period.

There were likely several factors at play that were responsible for this collapse. Specifically, global prices for iron and steel were under pressure due to over-supply in the major producer countries like China, setting off price dumping and lower margins for Australian exporters. Second, currency fluctuations, a stronger Australian dollar for parts of the year, might have possibly made Australian exports less competitive in the international market. Domestically, there may have been reduced production or production constraints, either due to plant closures or industry cost-reduction, affecting export capability. There may also have been policy-driven alteration, such as environmental regulation or reduced government subsidies, that affected the sector's output and export orientation.

On the other hand, Non-Ferrous Metals (Category 68) and Manufactures of Metals (Category 69) fared relatively better in 2016. Non-ferrous metals still enjoyed a healthier proportion of exports, perhaps due to sustained global demand for high-value metals like copper and aluminium that are used in electronics and renewable energy technologies. Manufacturers of metals possibly enjoyed value-added products or diversified markets that insulated them from the same level of volatility.

The comparatively poor show of Iron and Steel is the result of a combination of commodity dependence, low value addition, intense global competition, and local industrial problems, which has made it weaker compared to other subcategories that contain stronger or high-demand export items. The dashboard insight powerfully shows how 2016 marked a low point for iron and steel exports, a period where Australia was increasingly relying on imports while being less competitive in exports in this important material class.

## 5.3 Story Point 3

Trends in Iron and Steel By Trade and Time

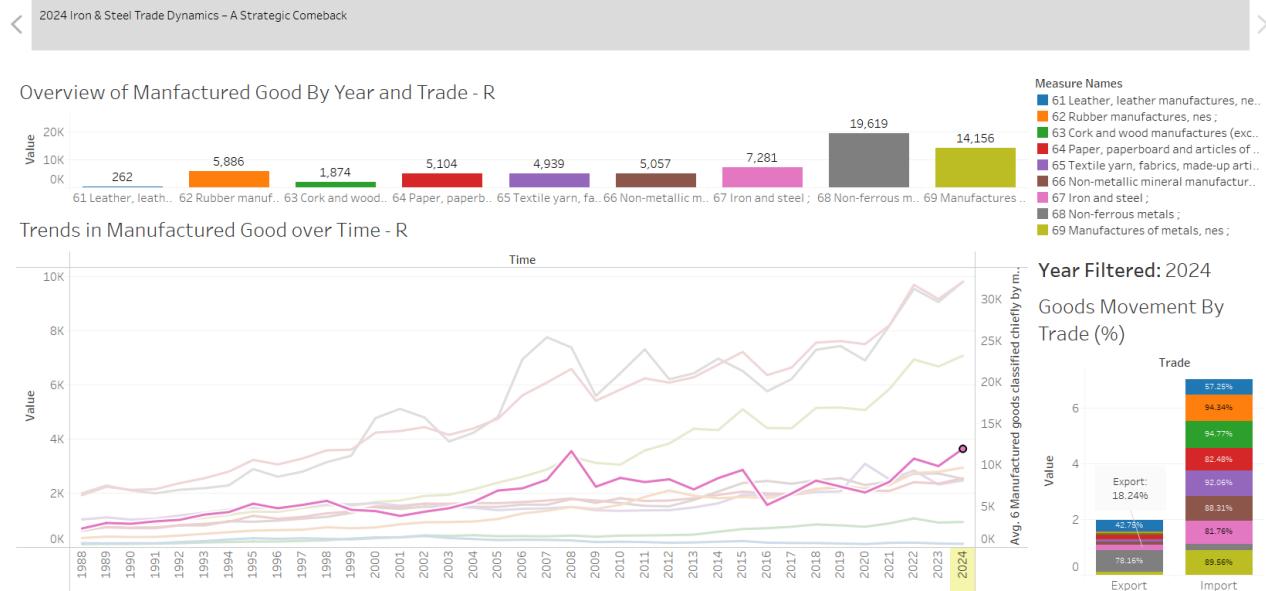


Figure 10: Figure 11: Story point 3 - Dashboard filtered by time and compared to other categories and Import and export trade distributions

The iron and steel industry in 2024 staged a strategic and strong comeback to Australia's "Manufactured Goods Mainly Classified by Material" category, reversing its downward trend and re-establishing itself as a cornerstone import-based business sector. This comeback was fueled by renewed national manufacturing policy, deregulation of imports, and targeted infrastructure development. These reforms significantly reduced trade tensions and eased the inflow of low-cost raw materials from global markets, especially for construction and heavy manufacturing needs, for Australian firms. As a result, imports of iron and steel picked up again, outpacing most other subcategories in both total value and share of trade.

Compared to 2016, when iron and steel exports plummeted to a paltry 19.1% of the trade share amidst global oversupply and domestic industry disruption, the 2024 statistics tell a very different story. While exports have not resumed dominance, import percentages have increased even more, demonstrating that Australia is now actively seeking import-led growth for this key industrial input. This is part of the government's broader strategy of building local value chains around competitively priced imported base materials. Rather than competing in foreign export markets, iron and steel is being repositioned as a foundation for domestic production expansion, supplying construction, transport, and manufacturing industries across the nation.

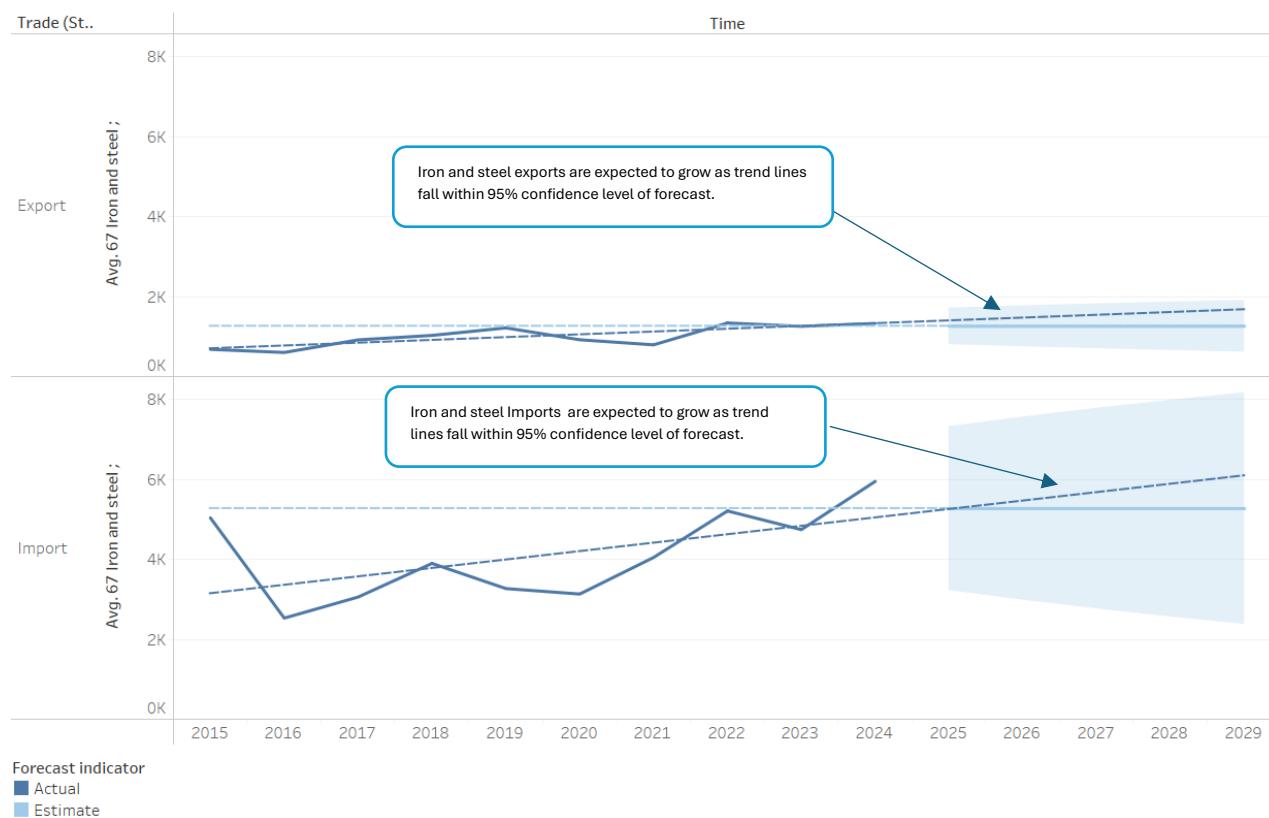
On the other hand, other industries like Non-Ferrous Metals and Manufactures of Metals have maintained relatively balanced import-export ratios, but without the same vigorous

trend of expansion. Their trade flows, which are more stable, reflect more mature or niche markets with less policy-driven stimulus than iron and steel. The volume of trade of iron and steel now equals or exceeds a number of its peers in the category, especially in terms of importation, once again establishing itself as one of the most economically significant material groups in Category 6.

The revival has been powered by a mix of domestic policy initiative, strategic procurement, and a new industrial strategy based on efficiency and cost-effectiveness. Instead of trying to emerge as a leading exporter, Australia's iron and steel industry has repositioned itself quite successfully to serve local industries through efficiently managed imports, developing a viable model of industrial competitiveness that acknowledges shifting global trade patterns and internal development priorities.

## 6. Future Forecast

Iron and Steel Forecast for 2025-2029



According to the reasoning behind the predictions indicated on the Tableau dashboard, Iron and Steel trade trend line from 2025 to 2029 is increasing and positive, meaning that the trend is stable and will increase over the years. The values are within the 95% confidence interval and therefore, the predictions are statistically valid and should continue in this

direction unless there are severe unanticipated events. The outlook is such that exports will be maintained at a level of about AUD 1,257.08 million yearly, and imports at a much higher level of about AUD 5,272.76 million yearly. What that means is that over a period of five years, Australia will likely import about AUD 26.36 billion worth of iron and steel ( $5,272.76 \times 5$ ) and export about AUD 6.29 billion ( $1,257.08 \times 5$ ). While exports are flat with no increase at all over the five-year span, the increases are largely on the import side, with steady high-volume arrivals supporting construction, manufacturing, and infrastructure. The trend line also shows that imported steel and iron demand is solid and increasing and is likely due to Australia's ongoing focus on industrial activity and large-scale infrastructure projects. The growth estimate over the base year 2024 shows the import levels as high and consistent, which may not be a huge percentage increase from one year to the next but reflects a consistent high plateau, a reflection of strong market confidence and stable policy environment. On the export front, there is no growth expected, although the steadiness in export values may serve as a benchmark for setting goals for future development by means of productivity or competitiveness gains in trade. The net trade gap overall will remain gigantic, pointing to the need for raising domestic production or finding means of increasing exports and lowering the reliance on imports in the long term.

## 7. Advantages & Disadvantages of Dashboards

### 7.1 Advantages

- Access to Real-Time Data: Dashboards offer real-time data to help users make timely, well-informed decisions.
- Filterable and Interactive: Users can click and filter data by category, time, or region for additional information.
- Visual Simplification: Graphs, charts, and visuals simplify the reading of trends in complex data.
- Quick Summary: Provides an overview of key metrics and KPIs at one place without needing to dig through raw data.

### 7.2 Disadvantages

- Information Overload: Visual or metric overload can overwhelm users and reduce clarity.
- Needs Technical Setup: Setting up and maintaining dashboards may involve software skill or resources.
- Does Not Provide Contextual Story: Dashboards show data but will not necessarily communicate the 'why' of trends without being combined with narration.

- Static Without Interaction: Dashboards can become static snapshots rather than interactive tools without proper design.

## 8. Advantages & Disadvantages of Storyboards

### 8.1 Advantages

- Clear Narrative Flow: Storyboards guide viewers step-by-step, telling a logical story behind the data.
- Better Communication: Great for conveying insights to non-technical stakeholders or audiences.
- Focused Analysis: Enables highlighting specific points or key moments without distraction.
- Stronger Engagement: Through the use of story techniques, it captures attention and provides meaning to data.

### 8.2 Disadvantages

- Less Interactive: Storyboards are linear in nature, so they may not offer free data exploration as with dashboards.
- Time-Consuming to Develop: Storyboards are time-consuming to prepare, design, and develop good stories.
- Limited Real-Time Use: Founded on static images and not refreshed in real-time.
- Subjective Bias: May convey the author's viewpoint, which can lead to biased picking of information.

## 9. Conclusion

In this analysis, we looked at both the broad category of "Manufactured Goods Mainly Classified by Material" and its most significant sub-categories, with a focus on iron and steel. Utilizing interactive dashboards and storyboards, we broke down the data from both a raw dollar and a statistical percentage standpoint. This gave us the ability to not only understand how much Australia had traded in total but also how each sub-category contributed to the overall picture. The column and line charts in the dashboard allowed us to track trends over time and compare the performance of iron and steel against other sub-categories like non-ferrous metals, paper and paper products, and manufactures of metals. The stacked bar chart showed how each sub-category was split between exports and imports as a percentage, allowing us to understand trade balance across the board. On the raw dollar basis, the main category saw steady expansion in imports over time, reflecting Australia's

increasing need for base materials. Iron and steel emerged as one of the leading value contributors in imports by 2024, a true stand-out performer in terms of growth. However, from a statistical standpoint, we observed that while iron and steel imports represented a larger share of the total trade of the principal category, exports were far smaller in percentage, revealing a widening trade gap. This trade gap was more evident in iron and steel than in some other sub-categories that maintained more balanced flows. For example, metal manufactures and non-ferrous metals had comparatively consistent import-export rates, indicating that they were less sensitive to changes in the market. A storyboard was also utilized to highlight important events in the past two decades such as 2008, 2016, and 2024. In 2008, imports of iron and steel increased significantly, surpassing metal manufactures as the second-largest imported item in the category. In 2016, it experienced a sharp drop in its iron and steel exports, ranking as the third-worst performer for that year. This drop was not so much felt in the other sub-categories, possibly due to external pressures especially on raw material exports. In 2024, iron and steel recovered strongly with improved manufacturing policies and better import procedures, again leading the import category while still lagging in exports. Peering into the future, our 10-year trend (2015–2024) and 5-year projection (2025–2029) in Tableau showed that the import of iron and steel will continue at about 5,272 million dollars, while exports will continue at 1,257 million dollars per year. The projected line trends upward in a 95% confidence interval, showing a sound prediction in favor of continued import dependence. This widening gap between import and export calls for action.

These observations lead to our recommendation that Australia must try to build up the iron and steel domestic production capability and export capability. This entails encouraging value-adding processes, investing in plant facilities, and developing policies that facilitate competitive pricing and global outreach. Monitoring sub-categories like non-ferrous metals, which are more in balance, can also supply strategies on how the trade flow of iron and steel could be improved.

Finally, the tools we used, dashboards and storyboards, ideally supported our analysis. The dashboard offered immediate, interactive trend overview, category comparison, and year filtering, which fit detailed analysis like a glove. The storyboard was utilized to tell the story underlying the numbers, explaining turning points in a simple and concise manner. Dashboards are ideal for real-time data exploration, while storyboards provide meaning and context. Together, these tools made this analysis possible and allowed us to reach tangible conclusions.