

**COS30045 DATA VISUALISATION**

**TP02-2024 Assignment 3B – Project process book Title: Economic Surveys Australia 2023 – Employment and Demand Indices**



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**Team 01B - Total word count (coming soon)**

**Link to Mercury-hosted website: https://mercury.swin.edu.au/cos30045/s103422254/assignment3c/**

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# Introduction

* 1. Background and motivation

Who will use or be interested in this visualisation (users)? What kind of tasks will they want to do? Why is this important?

There is no doubt that the economy is one of the most crucial factors in boosting a country’s value and elevating its global ranking. A strong economy not only enhances a nation’s standing on the world stage but also plays a vital role in ensuring that its inhabitants enjoy a stable and prosperous life. In this report, we aim to present comprehensive data visualizations that illustrate the economic statistics of Australia up to the year 2023, following the global pandemic. The datasets, sourced from the OECD Library website, reveal that while Australia’s economic growth recovered strongly and rapidly in the aftermath of the pandemic, this growth is now showing signs of slowing down. Our analysis will delve into these trends, providing insights into the factors contributing to the initial recovery and the subsequent deceleration.

We do believe that our data visualization will be playing a significant role in supporting inhabitants and also for organizations to have an overview insight of the Australia’s economic including Investor, Financial Analysts, Academics, Researchers, Businesses, Entrepreneurs, International Organizations, Media, Journalists and General public [1].

Obviously, various groups are interested in the Australian economy for different reasons, and data visualization plays a crucial role in this. Investors and financial analysts can use our charts to analyze market conditions, manage risks, and optimize investment portfolios. Businesses and entrepreneurs rely on our visual data to engage in strategic planning, financial forecasting, and improving operational efficiency. Academics and researchers utilize our visualizations to study economic trends, publish findings, and educate students. International organizations employ visual data to monitor economic performance, provide policy recommendations, and conduct comparative analyses. Media and journalists use visual aids to report on economic news, offer in-depth analysis, and raise public awareness. Meanwhile, the general public benefits from visual data to manage personal finances, plan careers, and keep track of the cost of living. Each group leverages data visualization to understand and influence the economic landscape of Australia effectively [2].

* 1. Visualisation purpose

What questions will the user be able to answer with your visualisation? List the possible benefits of the completed visualisation.

Team member - 103422254 (Thang Truong)

Data visualization enables users to answer a variety of questions by making complex data more accessible and understandable. From our understanding, the purpose of data visualisation will helps identify trends and patterns over time, compare performance across different products or regions, and understand the distribution of variables like age, trend, habits or income. Users can also explore relationships between the variables, detect outliers, and gain geographical insights. Additionally, visualization aids in resource allocation, performance tracking against targets, understanding users’ behaviours, and identifying operational inefficiencies [3].

According to my completed visualisation (dataset1) which can enable users to find out significant advantages information like

* The Line Chart illustrates an essential economic metric, showcasing Employment, Real Domestic Demand, and Nominal Domestic Demand.
* The trends in employment levels over year (quarters from each year have been added together -from Bar chart).
* The Area Chart provides an extensive depiction of Real Domestic Demand, covering almost a decade from 2016 to 2025, highlighting the total demand for goods and services within the economy.
* The Scatter Plot Chart depicts the variations in Nominal Domestic Demand over time.

From our perspective, data visualization offers numerous benefits, including saving users significant time in reading and researching statistics. It enhances decision-making, increases productivity, fosters innovation, and improves communication. Additionally, it helps businesses and Financial Analysts quickly interpret complex data, streamline operations, and identify new growth opportunities. Effective visualization also supports economic resilience during crises by aiding critical decision-making and resource allocation. Finally, it creates job opportunities in data science and analytics, contributing to overall economic development.

Team member: - 104924340 (Linh Doan)

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* 1. Project schedule

Make sure that you plan your work so that you can avoid a big rush right before the final project deadline. Write this in terms of weekly deadlines.?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Verify and working on datasets | Updating Project process book | Updating Project process book (cont.…) and start coding | Updating Project process book (cont.) and coding (cont.…) | Review and submit |
| From: 01st -Sep-2024 | From: 09th-Sep-2024 | From: 24th-Sep-2024 | From: 30th-Sep-2024 | 6-7th/10/2024 |
| To: 06th-Sep-2024 | To: 20th-Sep-2024 | To: 27th-Sep-2024 | To: 04th-Oct-2024 |
| Contribution: 20%  on each team member | Contribution: 20%  on each team member | Contribution: 40%  on each team member | Contribution: 20%  on each team member | Review, combination tasks and ready to submit |

# Data

* 1. Data source

From where and how are you collecting your data? Provide a link to your data sources. What type of data set (table, network, field) is it? What are the attributes in your data set and what type of data are the values (categorical, ordinal, interval, ratio/quantitative)? Is there any data in the set that will not be included in your visualisation? Why?

Team member - 103422254 (Thang Truong)

We collect 2 sample datasets from OECD Library website in terms of Economic growth recovered strongly from the pandemic and the economy recovered rapidly but growth is now slowing.

Please refer to the references to verify the credibility of the sources [4].

Dataset 1- Economic-growth-recovered-strongly

The datasets we had collected are being expressed in type of table format. It contains three attributes like Employment, Real domestic demand, and Nominal domestic demand. The values for these attributes are numerical, string and date format. They are wonderful in terms of used trend analysis and forecasting in economic contexts.

Data from our datasets had been cleaned and customised in terms of attractive to users and enhances the role of storytelling. The reasons are the original dataset associated with sample charts and having different format as we are not expected. This is not suitable for encoding.

Dataset 2- The-economy-recovered-rapidly-but-growth-is-now-slowing

Team member - 104924340 (Linh Doan)

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* 1. Data processing

Do you expect to do substantial data cleanup? What quantities do you plan to derive from your data? How will data processing be implemented? Will you be deriving any variables? You should also describe the cleanup process that was implemented as well as an explanation and calculation of derived variables (if used).

Team member - 103422254 (Thang Truong)

According to the dataset 1 we believe that it has a well-structured with consistent formatting and no obvious errors, duplicates or missing values. Next, we are ensuring that all dates and numerical values were consistent. We also normalized the data to make comparisons between different attributes easier. For the derived variables we are going to derive quantities such as growth rates to calculate the percentage change over time for employment, real domestic demand, and nominal domestic demand. Secondly, we will identify long-term trends in each attribute, analyze correlations between these variables. Finally, we will used existing data to calculate values from each quarter for a year and perform comparative analysis to understand economic shifts by comparing different time periods.

According to the dataset 2

Team member - 104924340 (Linh Doan)

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# Requirements

* 1. Must-have features

These are features without which you would consider your project to be a failure. Were you able to deliver all the promised features? If not, explain why.

Team member - 103422254 (Thang Truong)

Dataset 1:

From our perspective, the following features can make our project failed such as:

* Could not calculate the growth rate for employment, real domestic demand and nominal domestic demand by using Line Chart.
* Could not calculate the value of quarter per year and add them together and displayed them on Bar Chart.
* Charts are required to have xAxis and yAxis but could not showcase.
* Could not identify and analyzing seasonal patterns or cycles in order to accurate forecasting.
* Could not comparing different time periods to aware economic shifts for deriving meaningful insights.
* Could not use colour pallets effectively to highlight data points and engage with users.

To ensure the project is productive and effective, we are committed to delivering all the above features which considered as must have features in our project. This has necessitated the use of mathematical calculations to derive data from our dataset [5] and proficient in using D3 library version 6.

Dataset 2:

Team member - 104924340 (Linh Doan)

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* 1. Optional features

Those features which you consider would be nice to have, but not critical. Were you able to deliver any of these extra features?

Team member - 103422254 (Thang Truong)

We do know that there are some optional features could make our data visualisation go to another level such as integration with external data sources Incorporating additional data sources for a more comprehensive analysis. Automated reporting in terms of regularly update stakeholders on key metrics and improving the user interface to support users in terms of accessibility and user experience. Lastly, the website should be responsive and display effectively across various devices. However, we may not be able to deliver these optional features due to our commitment to other assignments.

Team member - 104924340 (Linh Doan)

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# Describe Visualisation design

How will you display your data? Provide some general ideas that you have for the visualisation design. Include sketches of your design. Include at least 2–3 alternative ideas for your visualisation. Describe and justify your choice of visual encoding and idioms. Show the evolution of your design. How has it progressed? Justify the visualisation idioms you have chosen to represent your data. Description (including screenshots) and explanation of final design.

Team member - 103422254 (Thang Truong)

According to our team discussion and perspective, we will use a bar chart to representation of sum of employment data spanning multiple years, a line chart to show crucial economic indicator in terms of Employment, Real Domestic Demand, and Nominal Domestic Demand over time, an area chart offers a comprehensive visualization of Real Domestic Demand over nearly a decade, spanning from 2016 to 2025 and a Scatter Plot chart to represent the changes in Nominal Domestic Demand over time in terms of measures the total demand for goods and services within the economy at current prices, without adjusting for inflation.

**Sketch designs**

Line Chart:

Bar Chart:

Area Chart:

Scatter Plot Chart:

We acknowledge that there are alternative tools like Tableau and Power BI [6], which allow users to explore data through filters and clickable elements. Additionally, Canva and Illustrator can combine charts, icons, and text to narrate a cohesive story. However, we have decided to use version 6 of the D3 library for our visualization. The main reason is that we have extensive experience working with practical labs associated with version 6 of the D3 library, and we are confident in our ability to create effective data visualizations using this tool.

The evolution of our design started with reviewing datasets and selecting appropriate idioms based on the data’s nature and the insights we aimed to convey. Initially, we considered bar charts for comparing categories and line charts for illustrating time trends. As the design progressed, I incorporated pie charts to highlight proportions and identify long-term trends across different time periods. Finally, we refined the design to ensure each visual element effectively communicated its intended message, utilizing our preferred library to create interactive and engaging visualizations. This iterative process resulted in a comprehensive and user-friendly data visualization.

**Final designs**

Line Chart:

A graph showing the growth of a number of individuals

Description automatically generated

Bar Chart:

A graph of employment growth

Description automatically generated

Area Chart:

A graph showing the growth of a number of domestic demand

Description automatically generated with medium confidence

Scatter Plot Chart:

A graph showing the growth of a number of percent

Description automatically generated

Team member: - 104924340 (Linh Doan)

Coming soon. . .

# Conclusion

Provide a summary of the project and what you learned from doing it.

This project focused on visualizing key economic indicators using datasets from the OECD Library website. These indicators highlighted the strong recovery of economic growth post-pandemic, and the economy recovered rapidly but growth is now slowing. We covered various categories, including Employment, Real and Nominal Domestic Demand, Inventories, Net Exports, Public and Private Consumption and Investment, Household Consumption, GDP Growth, and Real GDP from multiple countries, including Australia. Cleaning the datasets was essential for effective encoding. We acknowledged the importance of sketch designs before coding to avoid confusion about chart types and data fields. Utilizing various charts such as Line, Bar, Area, Scatter Plot, Stacked Bar, and Pie Charts, we effectively communicated complex data trends over time. Key learnings included the significance of data accuracy, clear and intuitive visualizations, improved skills in using D3 library version 6, and team collaboration to meet deadlines. Additionally, GitHub proved invaluable for storing and sharing files among team members.

# References

Provide a complete list of references consulted (including blogs, books, academic papers, discussions/forums) using the APA 7th edition style referencing conventions.

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6. DataCamp. (n.d.). *Power BI vs Tableau: Which one should you choose?* DataCamp. Retrieved September 15, 2024, from https://www.datacamp.com/blog/power-bi-vs-tableau-which-one-should-you-choose