Essential Data Skills of Celil Kankaya

Hello, my name is Celil, and I recently completed an intensive data skills bootcamp. This portfolio represents a culmination of the valuable knowledge and practical expertise I gained during the bootcamp. It encompasses a wide range of topics essential to data analysis, including MS Excel, Python, SQL, data preparation, visualisation, storytelling, and real-world applications. Each section provides an insightful dive into the skills and experiences that have prepared me to excel in the field of data analysis and contribute meaningfully to any team or organisation.

Employment Trends and Economic Growth

In this portfolio task, I'll delve into the exploration, collection, cleaning, and analysis of statistical data with the goal of uncovering trends in employment and economic growth in the UK.

Questions to Address:

1.How have employment rates changed over time?
2.Does retirement age play a big role in employment rates?
3.How does employment growth correlate with GDP growth?
4.Testing Arthur Okun’s economic theory

Data Sources:

- **Employment Data:** Office for National Statistics (ONS) - https://www.ons.gov.uk/employmentandlabourmarket
- **Economic Indicators:** UK Government Data Portal - https://data.gov.uk/economy
- *https://www.statista.com/statistics/281744/gdp-of-the-united-kingdom/*
- *http://www.web40571.clarahost.co.uk/statepensionage/SPA_history.htm*

Data Preparation, Quality & Validation

Sourcing

Reliable data is essential for informed decisions. I sourced mine from trusted authorities like the ONS and UK Government.

Techniques for Data Quality

I ensured quality through cross referencing with external sources to validate information accuracy.

Data Cleaning

The datasets were of high quality however some formatting was still required. (e.g. percentage point expressed in number format)

Data Preparation

The datasets were originally segmented by time in various intervals, such as quarterly or annually. I standardised them to an annual basis for consistency in my analysis, enabling me to focus on capturing broader trends rather than seasonal fluctuations.

Feature Engineering

In real-world datasets (like mine) some of the underlying relationships between features are complex and non-linear. In order to capture some of them (e.g. correlation between GDP and unemployment) I had to engineer a couple (e.g. built annual difference in percentage points)

Data Analysis and Storytelling

Trends

Utilising charts, I visually represented the data and studied positive and negative correlations to uncover underlying patterns and trends.

Testing Economic Theories

I applied theoretical frameworks to real-world data (Okun’s economic theory), aiming to discern how closely empirical observations align with established principles.

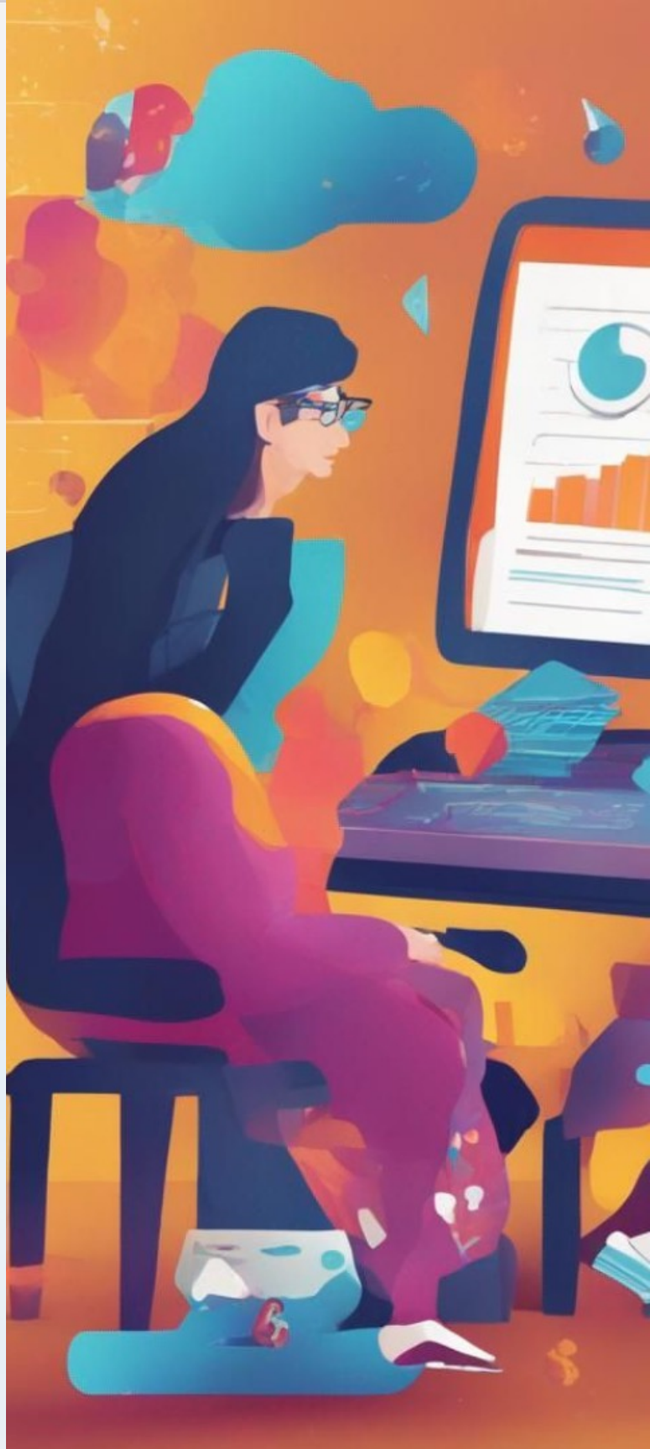
The Story that Data Tells

Ultimately, data-driven storytelling informs and inspires action, driving positive change across various domains.

Data Vis Techniques

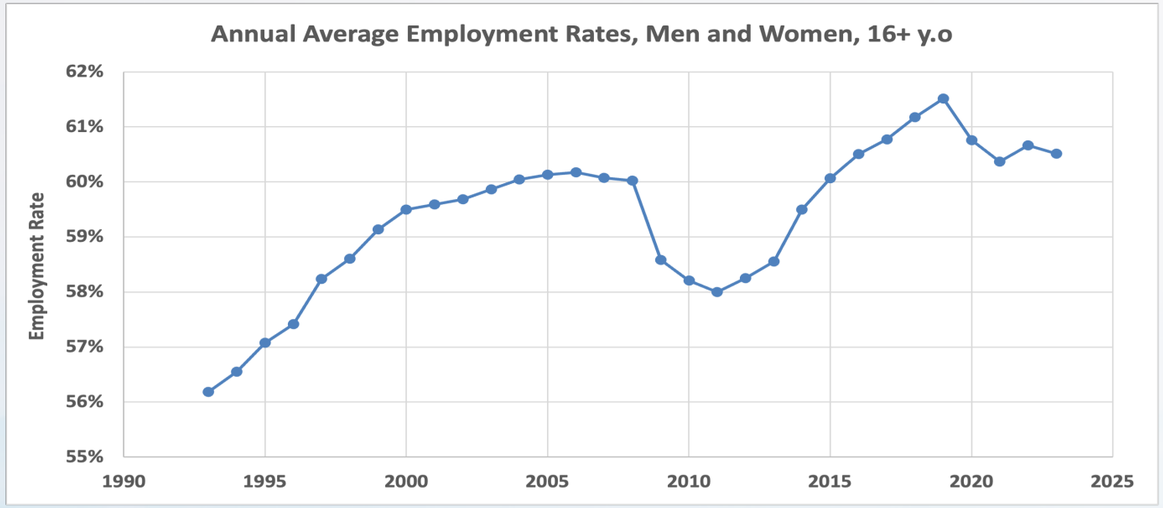
Through visualisation techniques like charts and graphs, data analysis transforms raw numbers into accessible visuals, making complex ideas easy to understand and engaging.

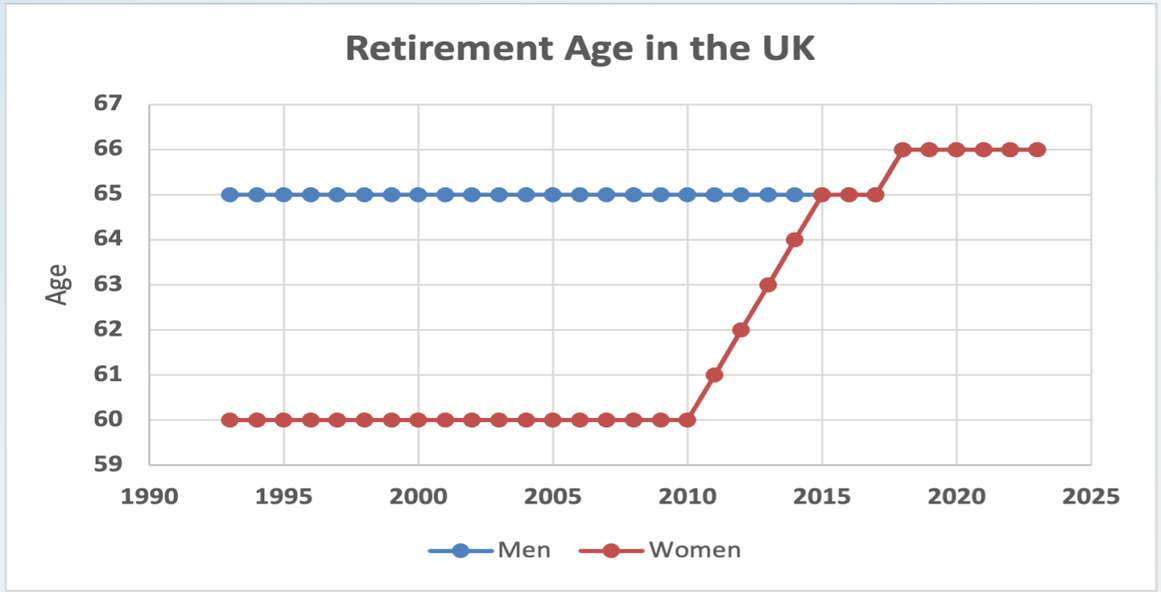
(Example of some of the tools I used: timelines to observe changes over time, scatter plot to visualise correlation (trendlines), etc.)



How have employment rates changed over time? Does retirement age play a big role?

- From 1993 to the early 2000s, employment showed steady growth.
- Between 2000 and 2008, prior to the Global Financial Crisis, it hovered around 60%.
- When the crisis struck, employment rates declined and continued to do so until 2011, reaching their lowest point in the 2010s.
- From there, rates began to improve, reaching their highest levels in 2019.
- However, due to the impact of the Global Pandemic, rates started to decline again. These observations encompass all demographics, including both genders and individuals of retirement age.
- Between 1990 and 2010 the retirement age remains the same (i.e. 60 for women, 65 for men), so the increase in employment was most probably not due to the longer stay in employment by the same population.
- Only after 2010 can retirement age be considered as a factor that might contribute to the increased employment rates. To be able to say that the retirement age causes the high employment rates, however we need to factor in net migration and the structure of the population (e.g. if in the studied period there are waves of migrants in working age entering the country with the intent to join the workforce, they might change the the ratio between employed and unemployed or inactive population).





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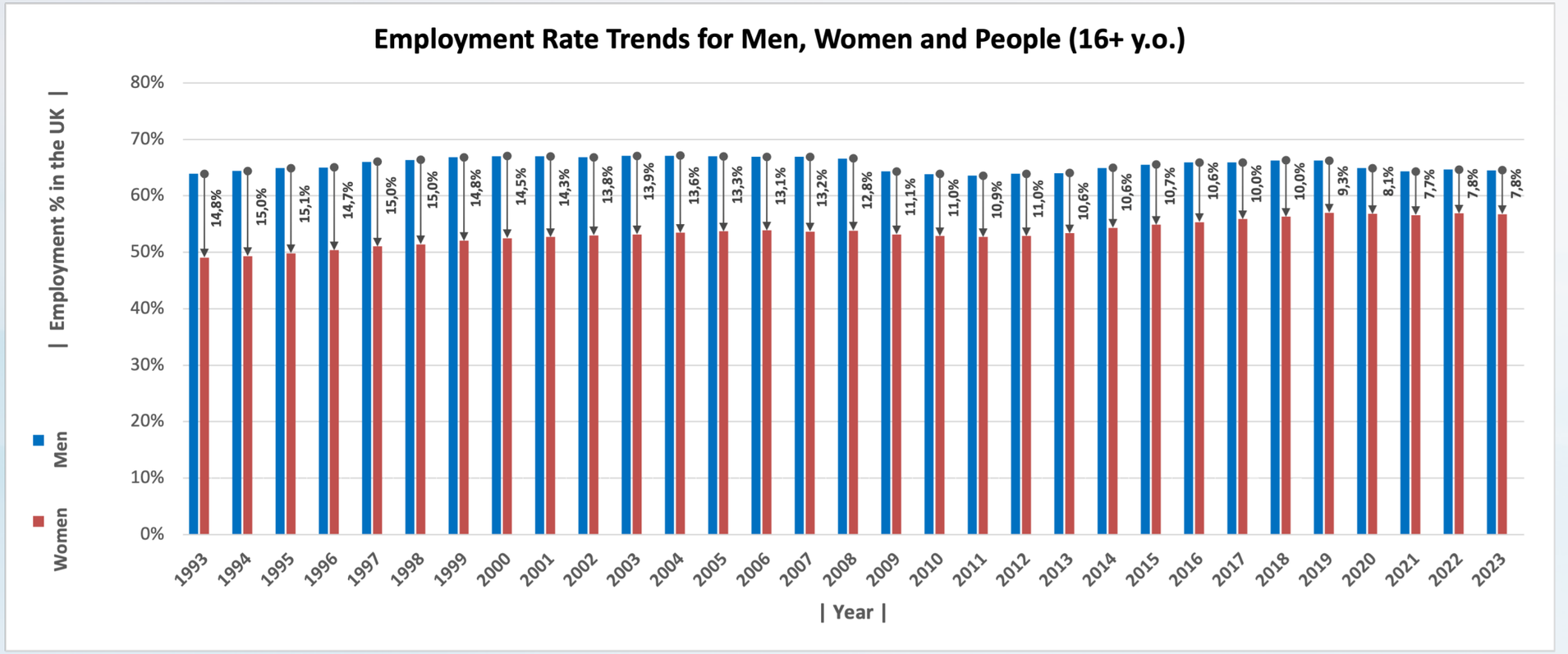
What role do men and women play in employment rates?

- Analysing employment rates for men and women reveals a gradual narrowing of the gap since 1993.

- While changes in retirement age contribute to this trend, other factors also play a role. Women increasingly seek financial stability and career growth opportunities, contributing to their more active participation in the workforce alongside men.



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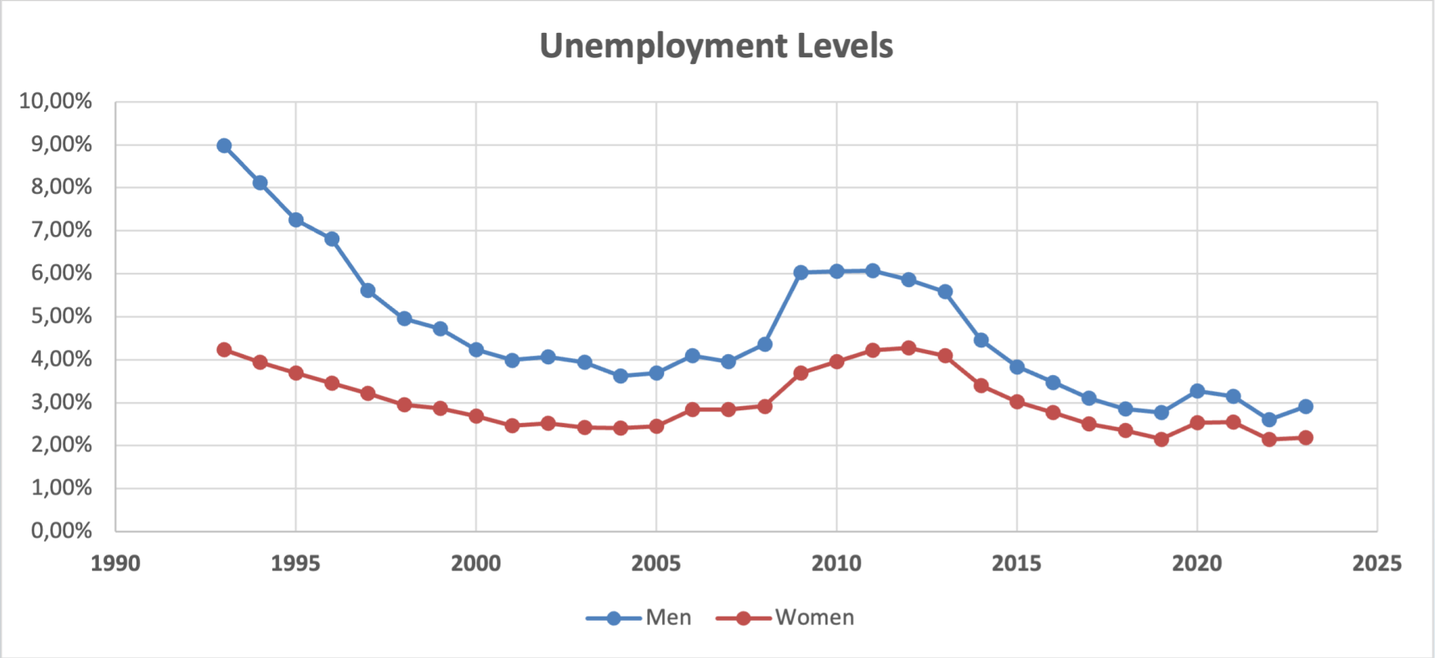
How men and women compare in unemployment rates?

- Unemployed individuals, like those who are employed, form part of the "active" segment of the population. Unemployment pertains to those actively seeking employment opportunities.
- Historically, women have exhibited lower engagement in paid employment (particularly towards the close of the previous century).
- They have also less susceptible to unemployment.
- Conversely, men have faced elevated unemployment rates in 90s and once again in the aftermath of the 2008 financial crisis.



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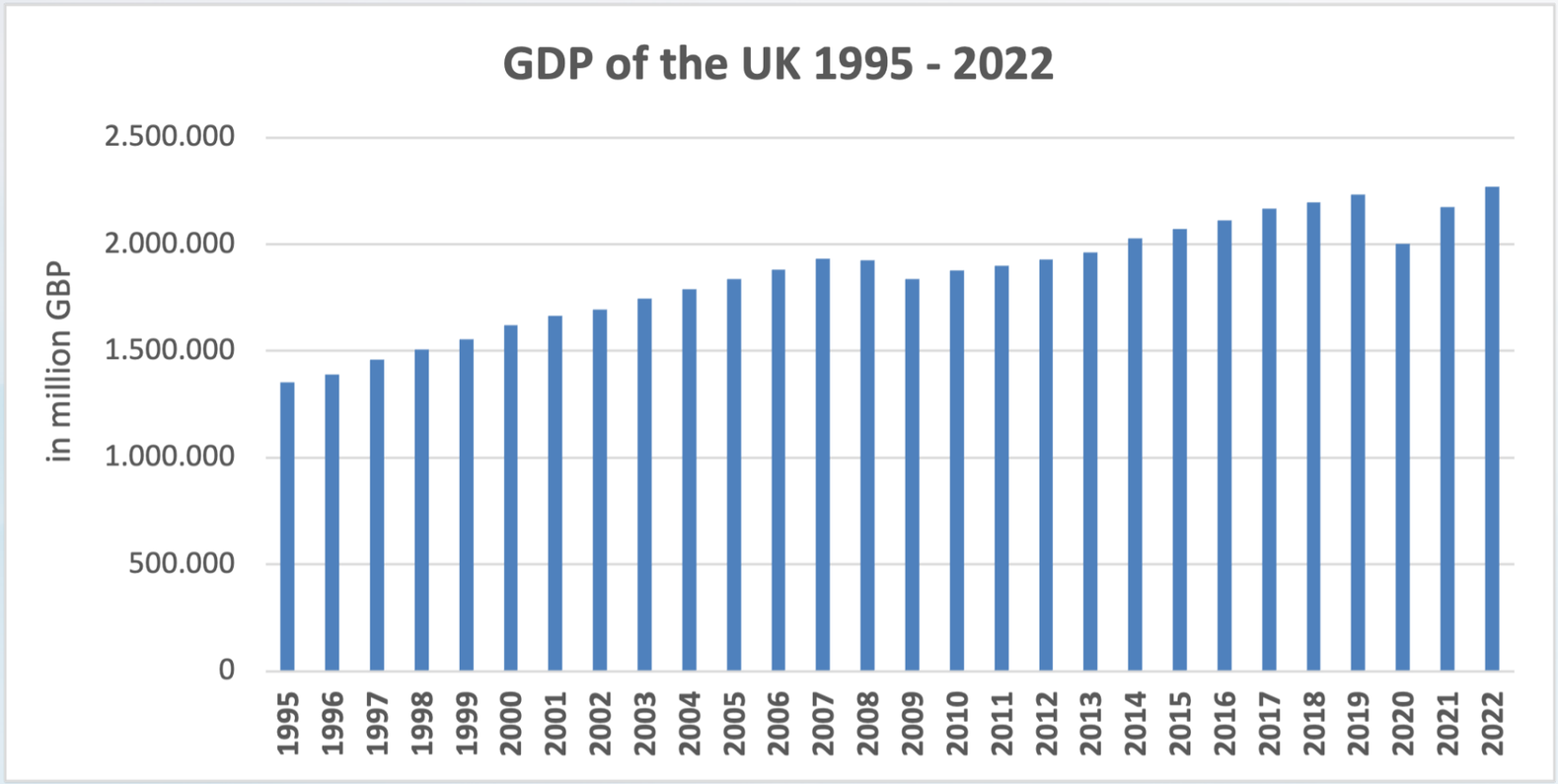
Real GDP of the UK 1995 – 2022

- Employment and unemployment rates and GDP are correlated economic indicators. While the correlation between the two depends on factors such as productivity, focus on what output is in demand and can be offered to external markets (export) and more, GDP real terms (as opposed to nominal GDP) can give us an idea of how the country is progressing.

- From 1995 onwards, real GDP exhibited consistent growth until 2008. However, with the onset of the crisis, real GDP experienced a decline, persisting until 2009. It took until 2012 for real GDP to return to its 2008 level. Subsequently, steady growth ensued until 2019, followed by a significant drop in 2020 attributable to the Global Pandemic. Despite this setback, real GDP has since resumed its upward trajectory.



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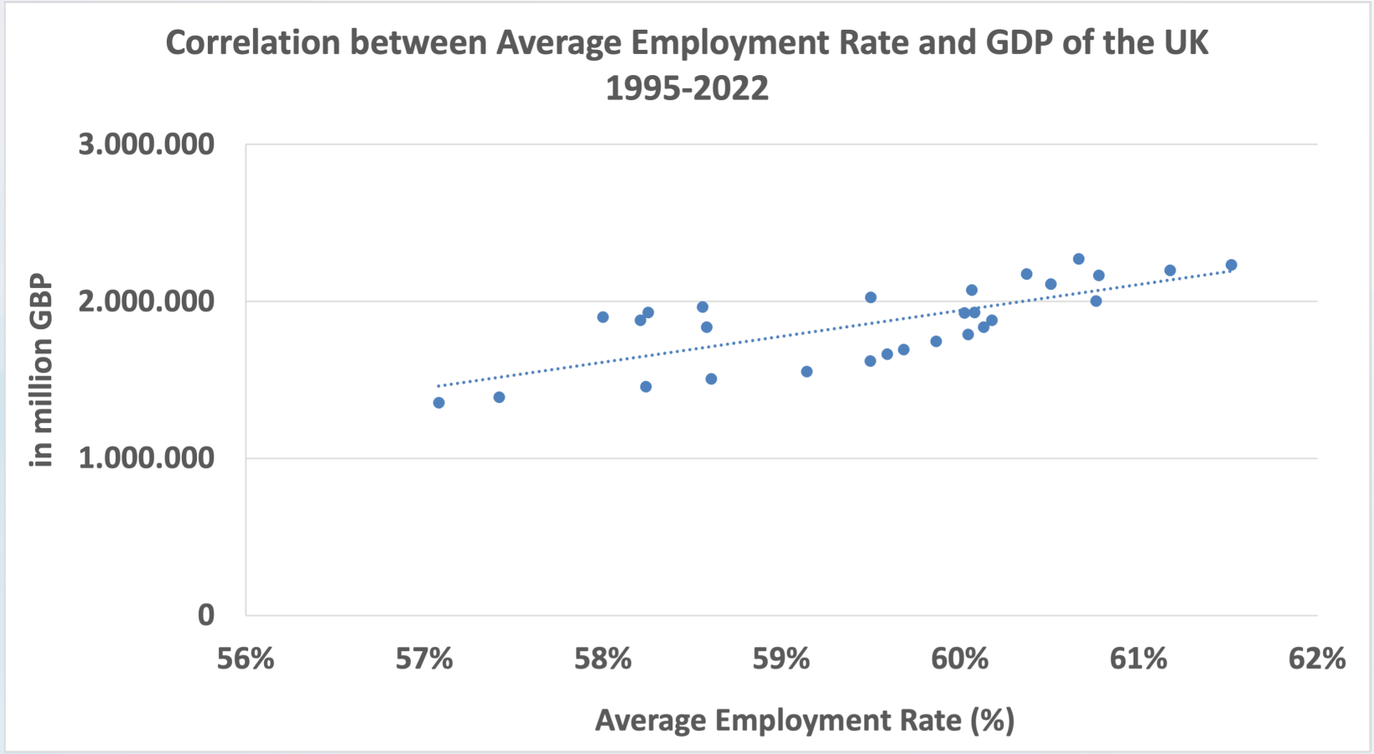
How does employment growth correlate with GDP growth?

- Upon visually plotting GDP against the average employment rate and observing the trend line, a positive correlation appears evident. However, for a more precise assessment of correlation, calculating it directly is necessary.

- Utilising the Excel formula for correlation calculation (=CORREL([GDP];[Average Employment Rate]) for the period 1995 - 2022, the resulting coefficient is **0.73**, indicative of a strong positive correlation between GDP and the average employment rate.



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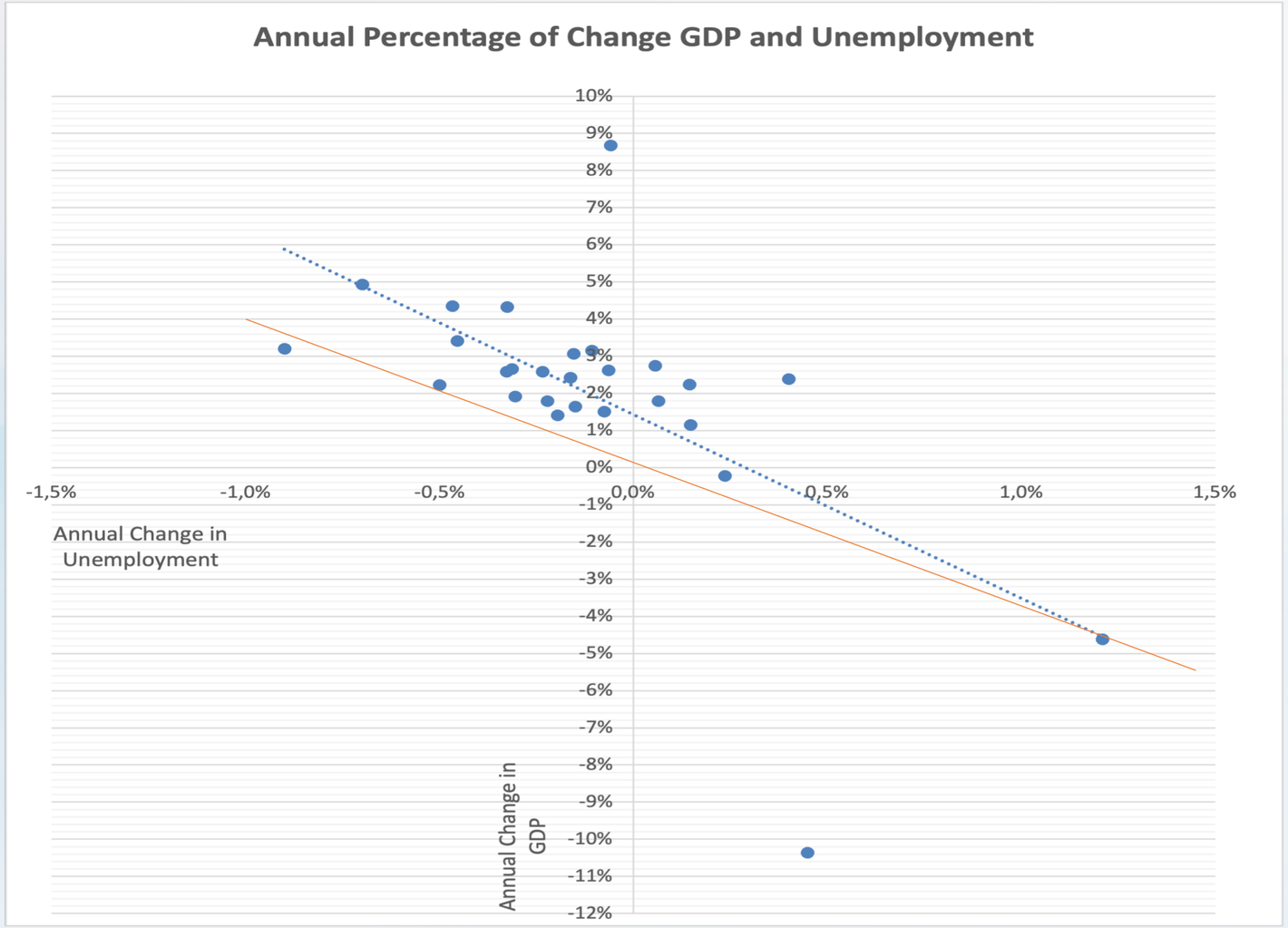
Testing Arthur Okun’s Economic Theory

- Okun's law posits that a country's gross domestic product (GDP) must grow at approximately a 4% rate for one year to achieve a 1% reduction in the unemployment rate.

- The orange line represents this theoretical relationship, where for every 4% change in GDP, unemployment changes by 1%. While some data points closely align with this line, the majority of points on the scatter plot lie above it. This suggests that while GDP experiences fluctuations, unemployment tends to remain relatively steady.

- Consequently, it appears that Okun's law does not precisely apply to the economic dynamics observed in the UK since the 1990s.



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Conclusion

Employment, influenced by various factors like population dynamics, education, labour policies, economic conditions, technological advancements, retirement age, labour market flexibility, and GDP fluctuations, is a cornerstone of economic activity. These factors interact intricately, impacting job creation, workforce participation, and overall economic health. Understanding these complexities is vital for fostering resilient labour markets and driving sustainable economic growth.

- My report delves into the evolution of employment rates in the UK over time, highlighting key trends and influences. From the early 1990s to the early 2000s, employment demonstrated steady growth, followed by a downturn during the Global Financial Crisis of 2008, leading to a subsequent recovery until 2019. The impact of the Global Pandemic, however, precipitated a decline in employment rates. Analysis suggests that while retirement age may have influenced employment trends post-2010, other factors such as net migration and demographic shifts also contribute.

- Gender dynamics in employment reveal a narrowing gap between men and women since 1993, with women increasingly seeking financial stability and career growth.

- Additionally, unemployment rates reflect historical disparities, with men experiencing elevated rates during economic downturns, notably in the 1990s and post-2008 crisis.

- Visual analysis suggests a positive correlation between GDP and the average employment rate, further affirmed by a calculated correlation coefficient of 0.73 using Excel, indicating a strong positive relationship.

- Lastly, the report tests Okun’s economic theory on the correlation between GDP and unemployment. The application of the theory suggests that Okun's law does not precisely apply to the economic dynamics observed in the UK since the 1990s.

As a conclusion, the report underscores the correlation between employment, unemployment, and real GDP, emphasising the broader economic implications of labour market dynamics.