DATA422

ANALYSIS & FORECAST OF NEW ZEALAND'S UNEMPLOYMENT RATE

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01

BACKGROUND

WHAT CAN INFLUENCE UNEMPLOYMENT RATE?

FACTORS IMPACT UNEMPLOYMENT RATE

Population

Macroeconomics

THE FACTOR WE ANALYZED

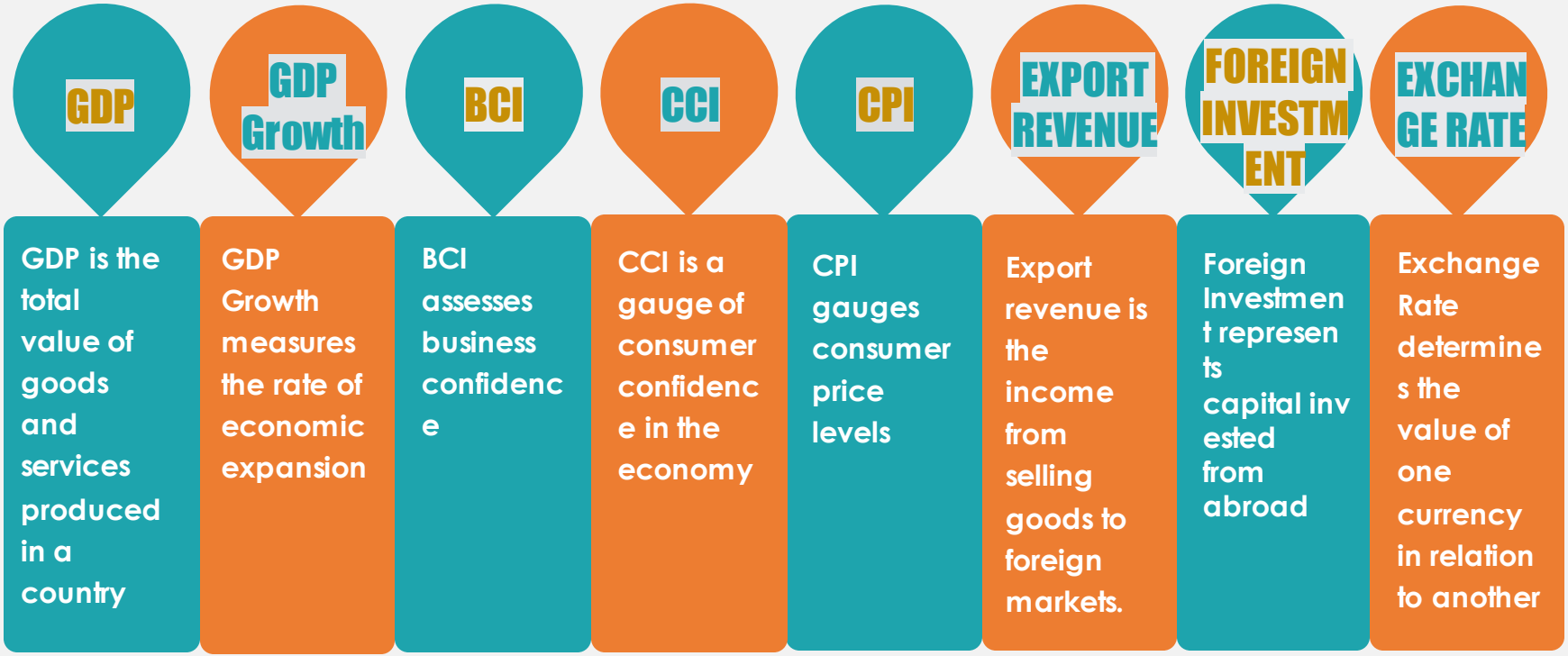
Religion & Culture

Politics

……

BACKGROUND

WHAT CAN INFLUENCE UNEMPLOYMENT RATE?



02

OBTAIN & CLEAN DATA

DATA
CLEANING

OBTAIN AND CLEAN DATA

ANALYTICAL APPROACH

Understanding the Unemployment Rates of Countries in the Same Region as New Zealand

STEP 1

Analyzing the Recent Performance of Macroeconomic Factors and Unemployment Rates in the New Zealand Region

STEP 2

Building Time Series Models to Forecast Unemployment Rates in New Zealand

STEP 3

OBTAIN AND CLEAN DATA

DATA SOURCE & TECHNIQUES

GET INDICATOR

World Bank

Obtained data on GDP, CPI, Unemployment Rate, and Foreign Investment from this website.

OECD

Provided data about the BCI and CCI can be found on this website.

USER-DEFINED FUNCTION

Interest.co.nz

A valuable resource to get New Zealand exchange rate information.

NZ MacroTrends

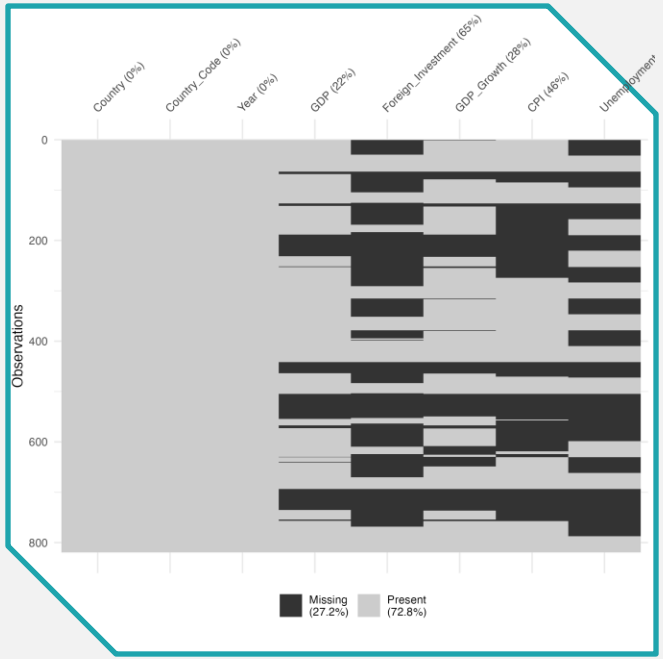
A simplified version of World Bank data; we utilized web scraping to directly extract the export information from this source.

DIRECT DOWNLOADS

WEB SCRAPING

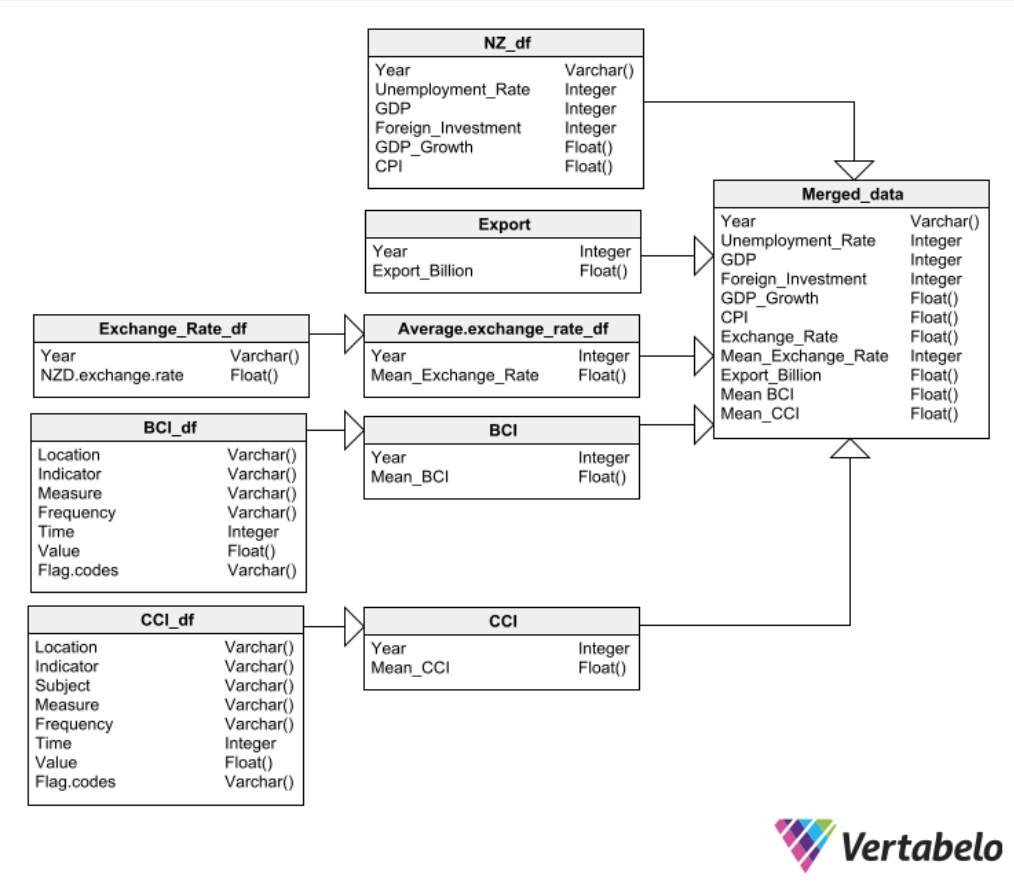
OBTAIN AND CLEAN DATA

MISSING VALUE PATTERN



COUNTRY	1960	1961	...	1991	1992	...	2022
AUSTRALIA	NA	NA	NA	9.580	10.730	...	3.661
GUAM	NA	NA	NA	3.510	3.840	...	6.134
JAPAN	NA	NA	NA	2.100	2.200	...	2.641
NEW ZEALAND	NA	NA	NA	10.610	10.670	...	3.253

RELATIONAL DATA

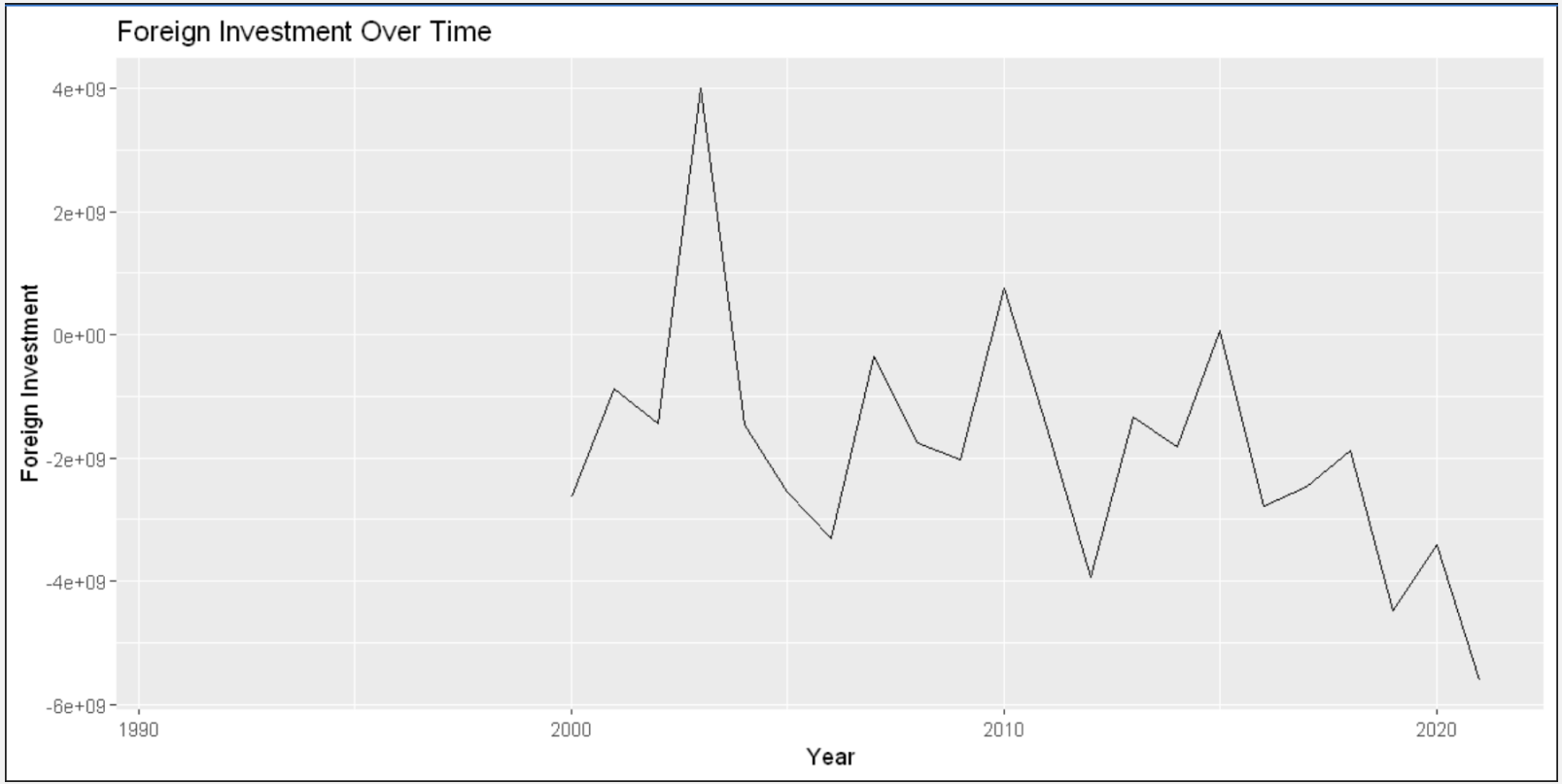


Vertabelo

CLEANED DATA

YEAR	UNEMPLOYMENT RATE	GDP	FOREIGN INVESTMENT	CPI	EXPORT	EXCHANGE RATE	CCI	BCI
1991	10.61	42744828653.3514	NA	2.60239285999773	12.46	1.72767460886336	96.8786883333333	99.1852841666667
1992	10.67	41649386969.5133	NA	1.01456027171234	12.99	1.85929624942375	99.4132233333333	103.025233333333
1993	9.8	46775038748.7573	NA	1.28820776574389	14.31	1.84994013781873	101.085166666667	103.5624
1994	8.35	55313381442.5437	NA	1.74537790773741	17.02	1.68568058209859	102.116308333333	103.182183333333

OBTAIN AND CLEAN DATA

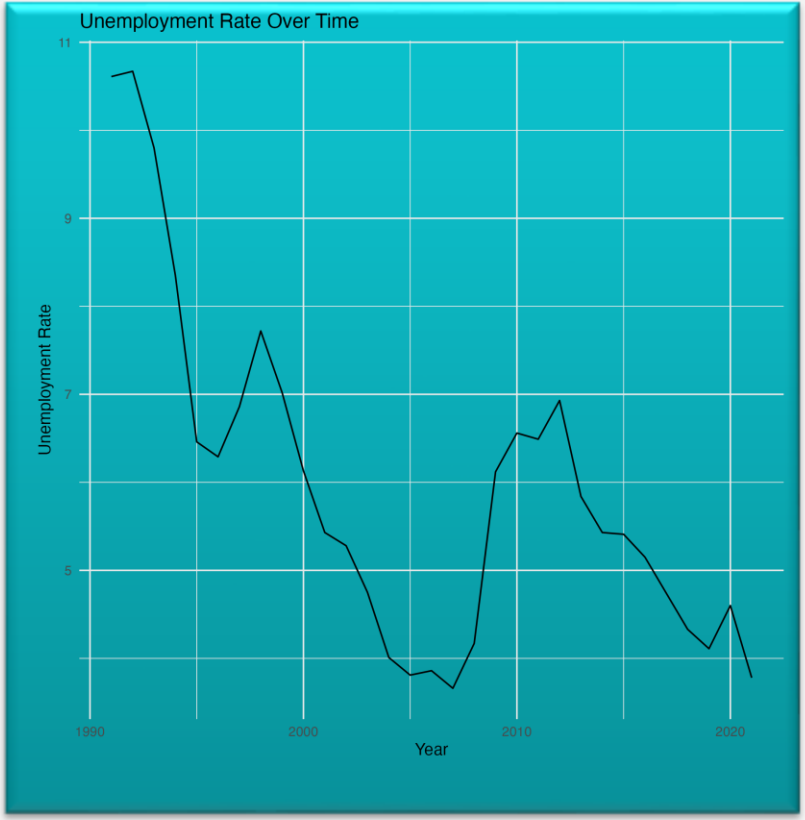


03

KEY FINDINGS

DISCOVERING INSIGHTS

KEY FINDINGS



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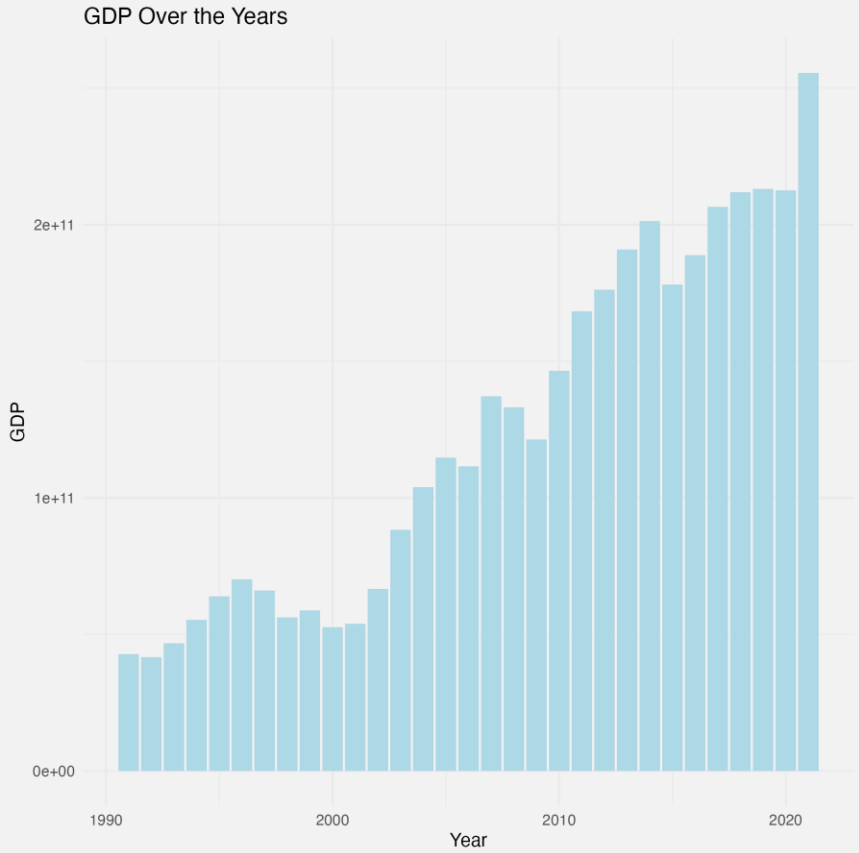

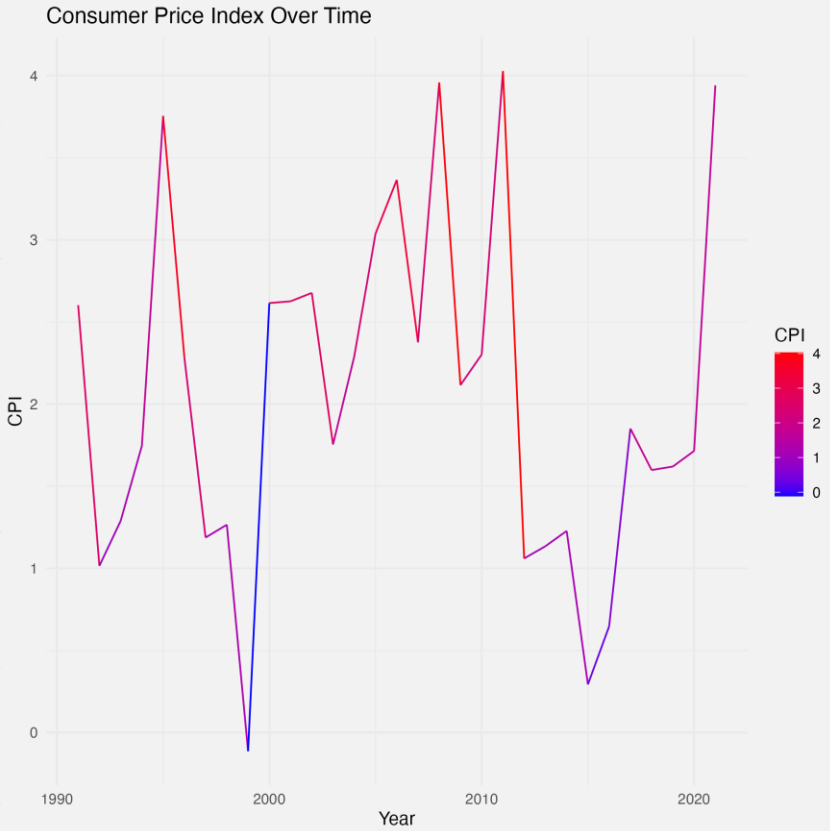

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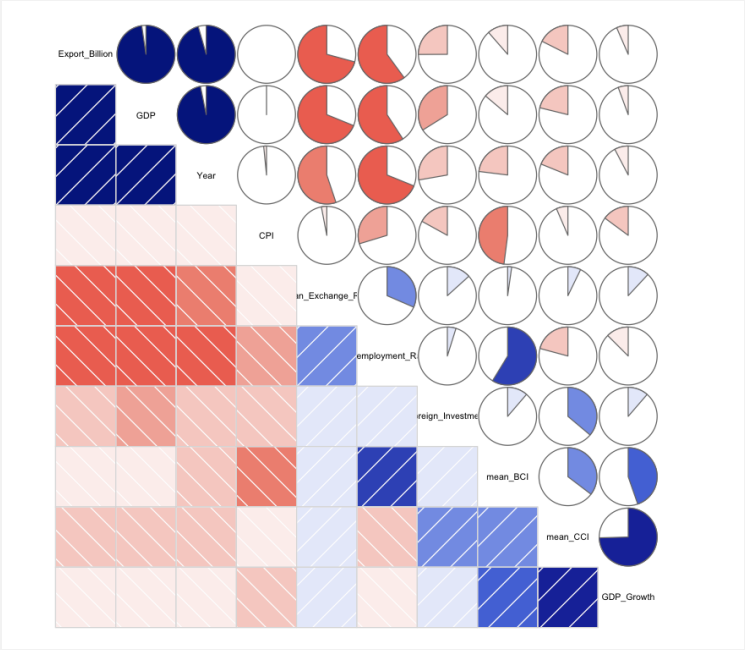

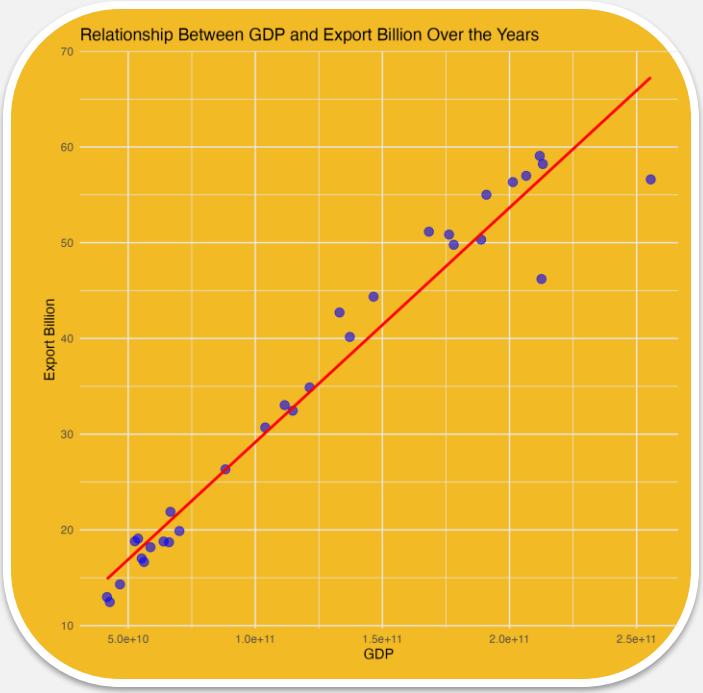

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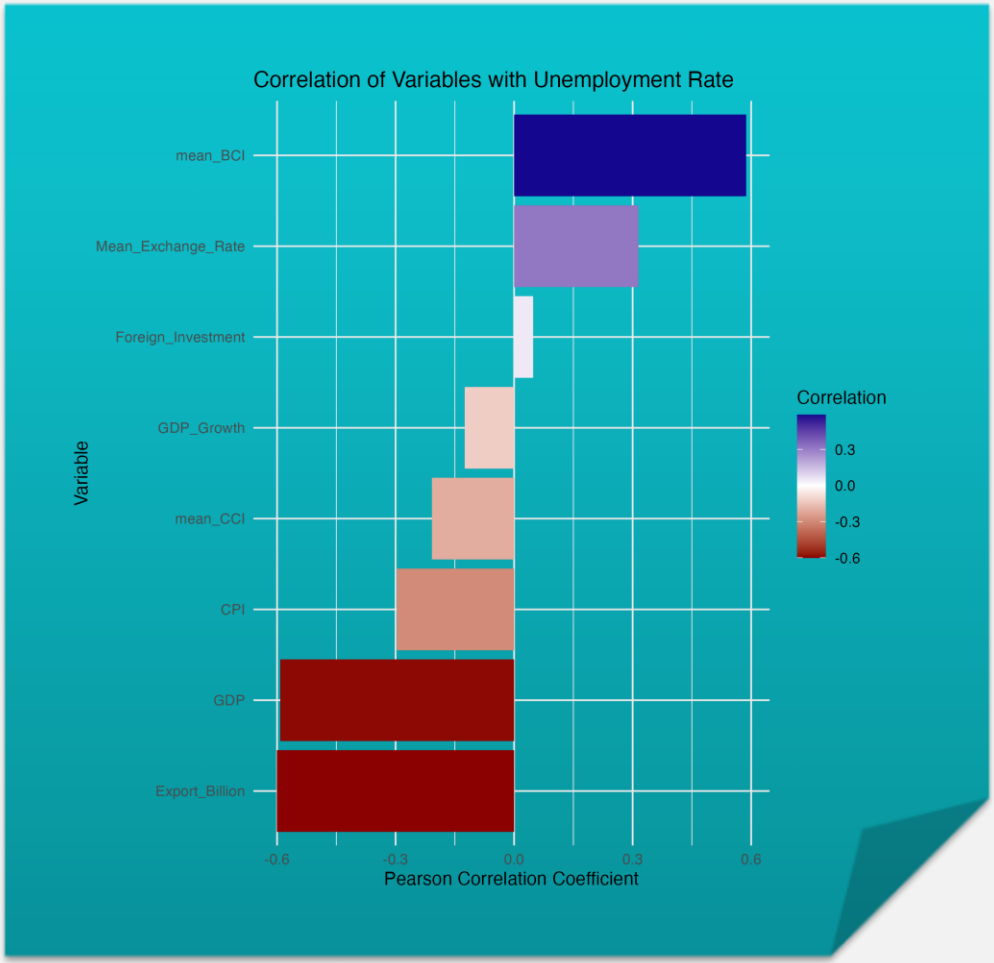


04

DATA
MODELLING

Data Modeling & Forecasting

DATA MODELING

Target & Strategy

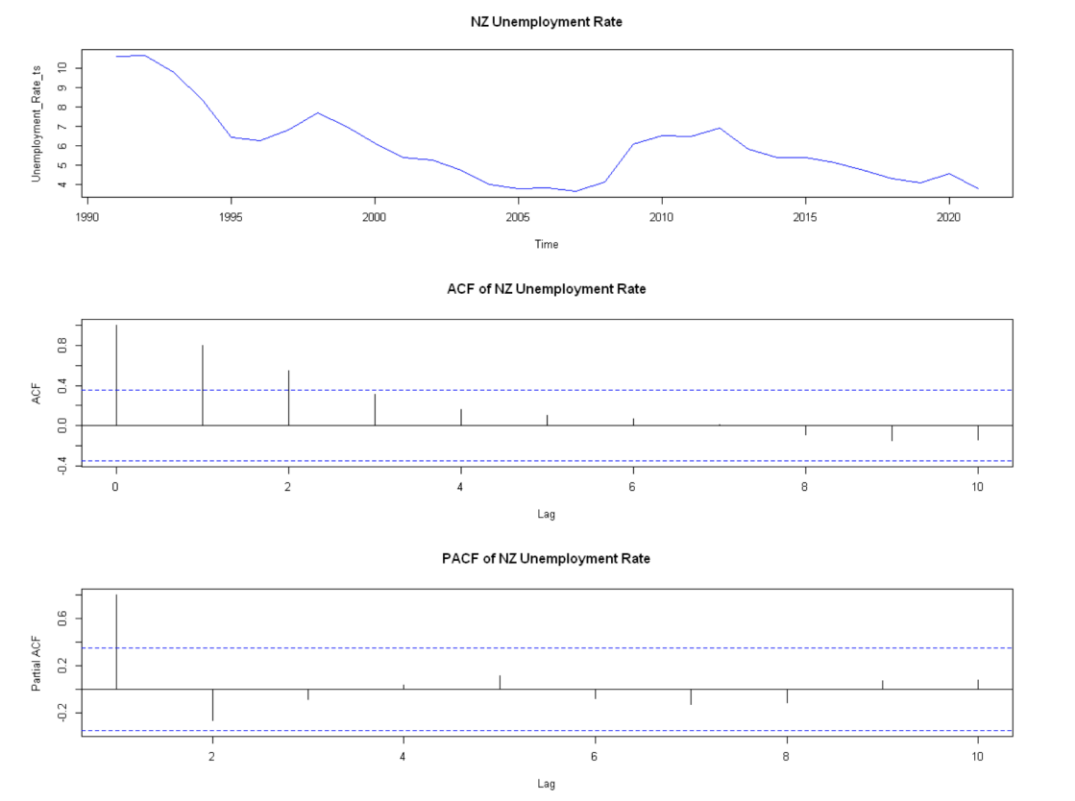
Target

Build a regression model to predict Unemployment Rate in NZ.

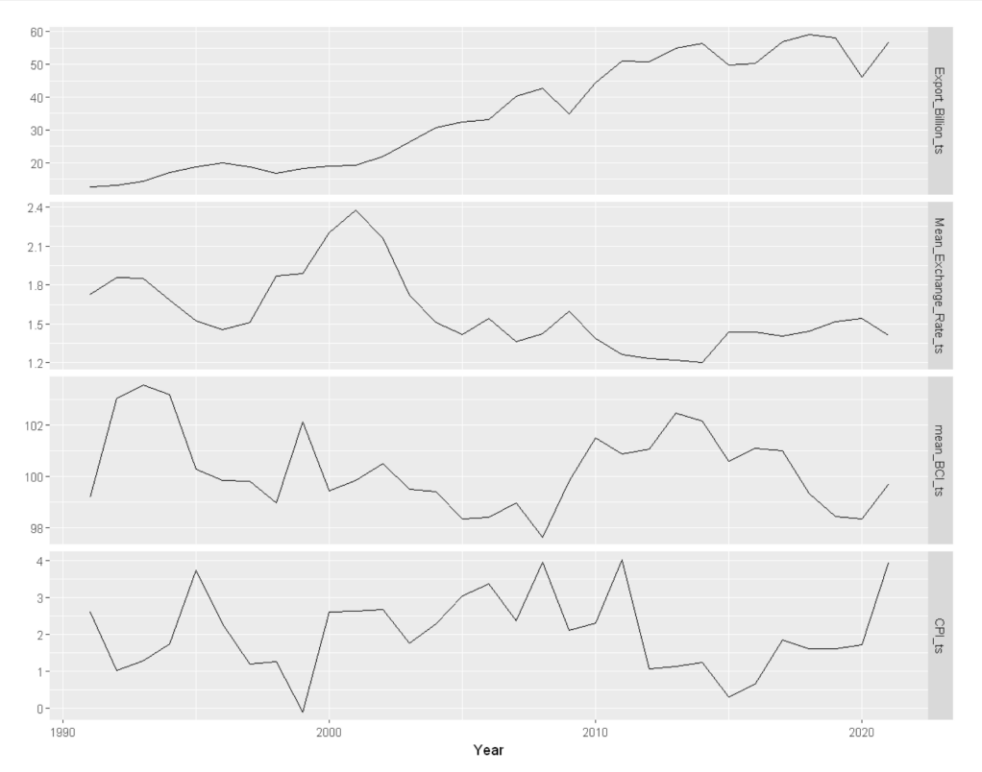
Strategy

1. **Dependent variable**
   y: Unemployment_Rate
2. **Regression variable matrix X will contain four variables:**
   - **Export_Billion**
   - **CPI**
   - **Mean_BCI**
   - **Mean_Exchange_Rate**

Unemployment Rate



The time series of all external factors



Perform KPSS test
&
First differences on all variables

ARIMA(1,0,0)

```
Series: Unemployment_Rate_diff
Regression with ARIMA(1,0,0) errors

Coefficients:
         ar1  Export_Billion_diff  Mean_Exchange_Rate_diff  mean_BCI_diff
      0.6321               -0.0428                   1.1782         0.0138
s.e.  0.1360                0.0225                   0.6651         0.0635
      CPI_diff
       -0.1497
s.e.    0.0771

sigma^2 = 0.263:  log likelihood = -20.06
AIC=52.11   AICc=55.77   BIC=60.52
```

Coefficient of AR(1) : 0.6321

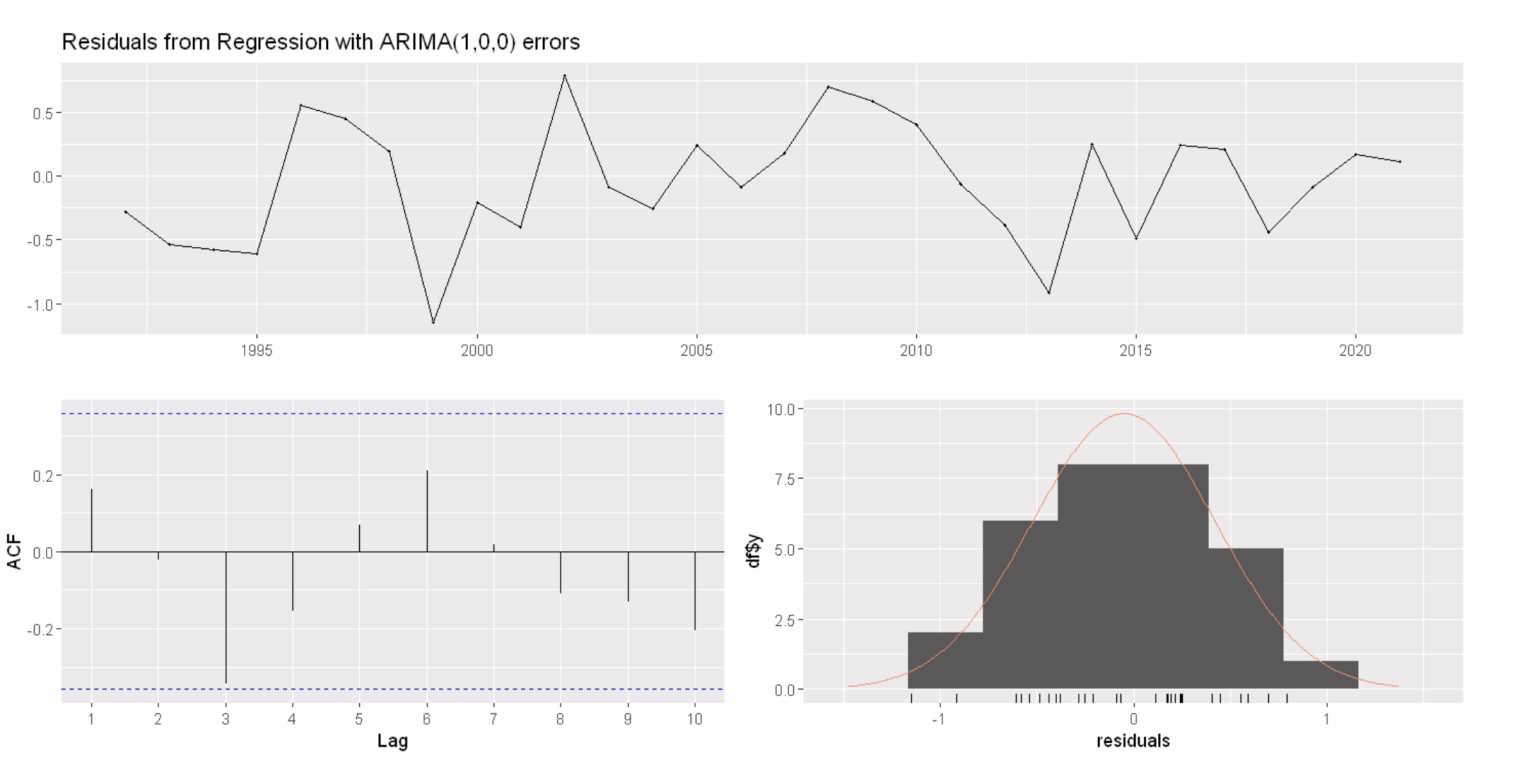
Export_Billion_diff : -0.0428

Mean_Exchange_Rate_diff : 1.1782

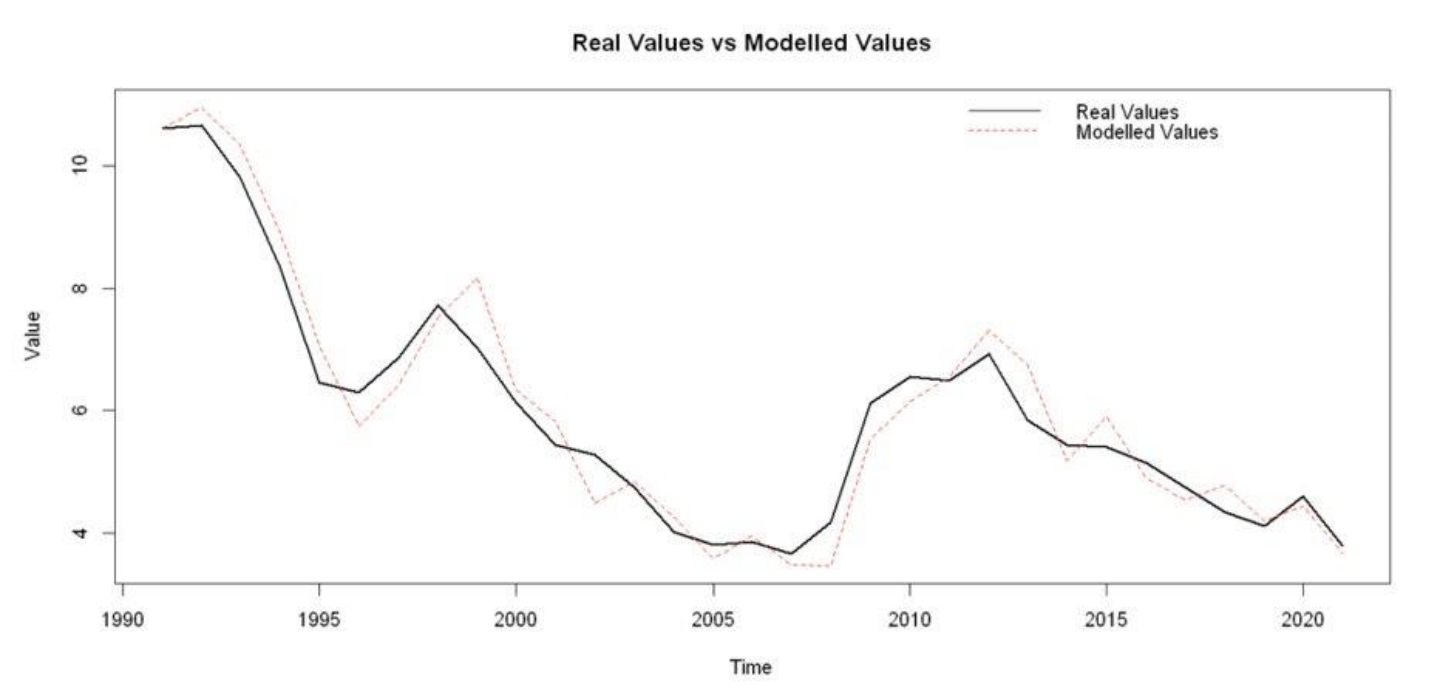
mean_BCI_diff : 0.0138

CPI_diff : -0.1497

Model residual analysis



Real Values and Modelled Values



The employment rate in the next two years

A data.frame: 2 × 4

Year	predicted	lower_95	upper_95
<chr>	<dbl>	<dbl>	<dbl>
2022	4.065567	3.060342	5.070793
2023	4.040083	1.845652	6.234513

THANK YOU!