

ANALYSIS OF INFLATION IN INDIAN ECONOMY

A MINI PROJECT REPORT

Submitted by

ALAN ALIAS (717821I202)

*in partial fulfillment for the award of the degree
of*

BACHELOR OF TECHNOLOGY

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE



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(AUTONOMOUS)**

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BONAFIDE RECORD OF WORK DONE BY

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Report submitted in partial fulfillment of the requirements assessment for the
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ABSTRACT

Inflation is a major economic challenge faced by many countries, including India. It affects the purchasing power of individuals and businesses, leading to an overall decline in economic growth and stability. Understanding the causes and effects of inflation is crucial for policymakers and stakeholders to formulate effective policies and strategies to control it.

The primary objective of this project is to analyze the impact of inflation on the Indian Economy. Specifically, the project aims to, Identify the causes of inflation in India. Examine the effects of inflation on various sectors of the Indian economy. Explore the relationship between inflation and unemployment. Assess the effectiveness of government and central bank policies in controlling inflation.

This project will use a combination of qualitative and quantitative methods to achieve the objectives. The research will rely on secondary data from various sources, including government reports, academic studies, and international organizations. Statistical analysis, such as regression analysis and time-series analysis, will be used to examine the relationship between inflation and other economic variables.

This project is expected to provide insights into the causes and effects of inflation on the Indian economy. The research will examine the impact of inflation on various sectors of the economy, including agriculture, industry, and services. It will also analyze the relationship between inflation and unemployment and its effect on investment and trade. Additionally, the study will assess the effectiveness of government and central bank policies in controlling inflation.

This project is expected to contribute to the existing literature on inflation and its impact on the Indian economy. The findings of this study will provide valuable insights into the causes and effects of inflation and its policy implications for policymakers.

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CHAPTER 1

INTRODUCTION

1.1 INFLATION

Inflation is the rate of increase in prices over a given period of time. Inflation is typically a broad measure, such as the overall increase in prices or the increase in the cost of living in a country.

1.2 UNEMPLOYMENT

Unemployment is when an individual who is not employed and is seeking employment, cannot find work. Unemployment is a key indicator of the health of an economy. A low unemployment rate represents a strong economy while a high unemployment rate represents a weak economy.

1.3 CONSUMER PRICE INDEX

In India, the Consumer Price Index (CPI) is used as the standard for measuring inflation. The CPI measures the retail price change of goods and services and is calculated by taking a basket of 299 commodities. The CPI is calculated by taking the average weighted value of each item in the basket. The CPI is measured monthly, and the numbers are typically released with a significant lag. The CPI is used as an essential economic tool by the Reserve Bank of India and the central and state governments.

1.4 WHOLESALE PRICE INDEX

The Wholesale Price Index (WPI) is one of the two main inflation indices used in India to measure the average change in prices of goods at the wholesale level. The WPI is published by the Office of Economic Adviser, Ministry of Commerce and Industry, and has been in use since 1942. The WPI is calculated by taking the price of goods before they reach consumers and helps in monitoring price movements that reflect supply and demand in industry, manufacturing, and construction activity. The WPI is set at 100 for its base period, and the index numbers used to measure the change in the overall price of goods are calculated based on the prices of goods traded between corporations. The WPI has an influence on the stock and fixed price markets.

1.5 MONETARY POLICY

Monetary policy refers to the policy of the central bank, the Reserve Bank of India (RBI), in matters of interest rates, money supply, and availability of credit. The RBI is the central monetary authority in India and controls the supply of money in the economy. The Monetary Policy Committee (MPC) is entrusted with the task of fixing the benchmark policy rate (repo rate) required to maintain inflation within the specified target level. The MPC is a statutory and institutionalized framework for maintaining price stability while keeping in mind the objective of growth. The monetary policy in India is carried out to ensure price stability and generate trust in the currency. The RBI uses various instruments such as the repo rate, reverse repo rate, cash reserve ratio, and statutory liquidity ratio to implement monetary policy. The RBI also communicates its monetary policy decisions to the public through various channels.

1.6 FISCAL POLICY

Fiscal policy refers to the use of government spending and taxation to influence the economy. Fiscal policy decisions are made by the government and are aimed at achieving sustainable growth and reducing poverty. Fiscal policy is often used in tandem with monetary policy to achieve certain goals. The government can use fiscal policy to promote strong and sustainable growth by increasing government spending or reducing taxes. Conversely, the government can reduce government spending or increase taxes to slow down the economy. Fiscal policy decisions can have predictable consequences, such as a decrease in personal taxation leading to an increase in consumption. The role and objectives of fiscal policy gained prominence during the recent global economic crisis. Fiscal policy is often contrasted with monetary policy, which is the use of the central bank to control the money supply and interest rates.

1.7 CAUSES

1.7.1 DEMAND-PULL EFFECT

Demand-pull inflation occurs when an increase in the supply of money and credit stimulates the overall demand for goods and services to increase more rapidly than the economy's production capacity. This increases demand and leads to price rises. When people have more money, it leads to positive consumer sentiment. This, in turn, leads to higher

spending, which pulls prices higher. It creates a demand-supply gap with higher demand and less flexible supply, which results in higher prices.

1.7.2 COST-PUSH EFFECT

Cost-push inflation is a result of the increase in prices working through the production process inputs. When additions to the supply of money and credit are channeled into a commodity or other asset markets, costs for all kinds of intermediate goods rise. This is especially evident when there's a negative economic shock to the supply of key commodities. These developments lead to higher costs for the finished product or service and work their way into rising consumer prices. For instance, when the money supply is expanded, it creates a speculative boom in oil prices. This means that the cost of energy can rise and contribute to rising consumer prices, which is reflected in various measures of inflation.

1.7.3 BUILT IN INFLATION

Built-in inflation is related to adaptive expectations or the idea that people expect current inflation rates to continue in the future. As the price of goods and services rises, people may expect a continuous rise in the future at a similar rate. As such, workers may demand more costs or wages to maintain their standard of living. Their increased wages result in a higher cost of goods and services, and this wage price spiral continues as one factor induces the other and vice-versa.

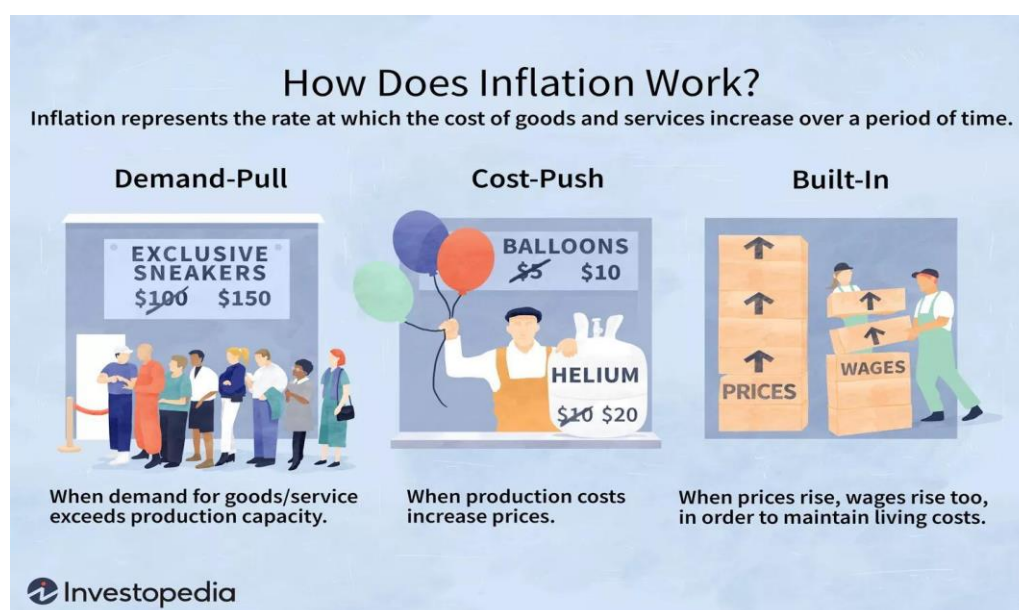


Fig 1.7.1 Causes of Inflation

1.8 DEFLATION

Deflation is a decrease in the general price level of goods and services. It occurs when the inflation rate falls below 0%, which means that the purchasing power of money increases over time. Deflation can be caused by a contraction in the supply of money and credit in the economy, or by increased productivity and technological improvements. While a slight decrease in prices may spur consumer spending, broad deflation can discourage spending and lead to a reduction in economic activity. Longer periods of deflation can also lead to higher unemployment and a decrease in demand. Deflation is generally considered a problem in modern economies because it increases the real value of debt, especially if it is unexpected, and may aggravate recessions and lead to a deflationary spiral.

CHAPTER 2

LITERATURE SURVEY

2.1 A Study on Inflation in India

In the study of inflation by Nagabhushana Rao and P. Chenchu Reddy explained how inflation hinders the growth of our nation. They have done clear analysis over the past five years, particularly on food inflation, demand and supply side factors behind surging food prices. Pointing out the impact on rising and falling of food articles and its prices.

2.2 The Study of Inflation Rate and Relative Impact on The Indian Economy during Covid-19 Pandemic

In the study of inflation by S.K.S Yadav he explained about the core inflation in covid pandemic time, the high inflation is not only because of high food inflation it is due to increase in the cost of transportation and the major reason for high inflation in transportation is because of increase in the prices of diesel and petrol due to that fares of buses, taxies, auto rickshaws have gone up. Due to pandemic the wholesale and retail inflation increased continuously .To reduce inflation pressure the government has increased taxes and decreased government spending.

2.3 A Review on Inflation in India-Causes, its Impacts, Trends and Measures to Control

In the study of inflation by G.I Parvathamma, she explained that the ideal inflation rate is 6–7 % and the causes of inflation are increasing supply of money and decreasing/lack of supply of goods and decreasing demand for money, demand for goods goes up. The measures of inflation used are CPI, PPI, commodity index. Measures to control inflation are monetary policy and fiscal policy. This paper also addresses about money supply and inflation.

2.4 Prices and Inflation Successful Tight-Rope Walking

It is not wishful thinking that 2023 will show less macroeconomic volatility than its preceding financial year. Both CPI-C and WPI have fallen below 6 per cent (which is the RBI tolerance limit for the former) and are on the descending slope of the surge that hit the economy in the first half of the current fiscal. International crude oil prices, the principal drivers of inflation this financial year, have returned to normal levels and so have prices of other major commodities. RBI forecasts elevated domestic prices for cereals and spices in the near term owing to supply shortages. Milk prices are also expected to spike reflecting high feed costs. In general, climate across the world has become increasingly erratic, further fortifying upside risks to food prices. A lot depends on industrial input prices: they may ease, but on the flip side their delayed pass-through to consumer prices may contribute to the stickiness of core inflation.

2.5 Stock Market Reaction to Inflation Announcement in the Indian Stock Market

We used the market model to predict future stock returns and further adopted a simple OLS regression to get the parameters of the regression equation. We then compared the t-statistics to check for statistically significant abnormal returns. The major finding is that we reject the null hypothesis, $AR = 0$. We find strong evidence to reject the hypothesis that Indian markets reflect the information content of the inflation announcement, and there is no abnormal return. However, the market reaction is different across sectors and inflation switching regime. The inflation effect seemed to dying as India moved from WPI to CPI and later when it adopted IT. One explanation is that continued experience of the IT regime has brought about a greater understanding of the RBI monetary policy decisions. Hence there are fewer surprises post the IT regime as inflation and interests rate are somewhat predictable.

CHAPTER 3

METHODOLOGY

3.1 DATA COLLECTION

Collect data on inflation in the Indian economy from reliable sources such as the Reserve Bank of India (RBI), National Bureau of Statistics, and other government agencies. The data should include inflation rates over a period of time, such as monthly or quarterly inflation rates.

3.2 DATA CLEANING AND PREPARATION

Clean and prepare the data for analysis. This includes removing any missing or duplicate data, converting data types, and transforming the data as needed.

3.3 DATA ANALYSIS

Conduct exploratory data analysis on the data to identify trends and patterns in the inflation rates. This can include calculating the mean, median, and standard deviation of the inflation rates, as well as identifying any outliers or anomalies in the data.

3.4 STATISTICAL ANALYSIS

Conduct statistical analysis on the data to identify the factors that drive inflation in the Indian economy. This can include regression analysis to identify the relationship between inflation and other economic variables such as Unemployment, GDP, FDI, and trade balance.

3.5 INTERPRETATION AND REPORTING

Interpretation and Reporting: Interpret the results of the analysis and prepare a report on the inflation trends in the Indian economy. The report should include an executive summary, methodology, data analysis, and conclusions.

CHAPTER 4

INFLATION AND UNEMPLOYMENT

4.1 ABOUT

India witnessed a high level of inflation in 2013, which had a significant impact on the economy and the standard of living of the people. The inflation rate in India for 2013 was 10.91%, which was higher than the average rate of 7.6% for the previous five years. The following is a detailed analysis on the 2013 inflation in India.

4.2 CAUSES OF 2013 INFLATION

The primary reasons for the high inflation rate in India in 2013 were the increase in food prices, fuel prices, and the depreciation of the rupee. The country had a drought in 2012, which led to a shortage of food grains, resulting in an increase in food prices. The fuel prices were also hiked several times during the year, which contributed to inflation. Additionally, the Indian rupee depreciated significantly against the US dollar, leading to an increase in the cost of imported goods and services, including petroleum products.

4.3 IMPACT OF 2013 INFLATION

The impact of inflation on the Indian economy in 2013 was significant. The inflation rate in India was 9.13% in 2013, which was 2.04 less than it was in the preceding year of 2012 and 3.27% more than in the following year of 2014. According to, maintaining a 5.43% inflation rate does not hurt the Indian economy, but above that rate, there is an inverse relationship between inflation rate and economic growth. Some experts have cited supply-side constraints arising from policy bottlenecks as a cause of inflation in India. According to, there is a negative long-run relationship between inflation and economic growth in India. The high inflation rate in India in 2013 may have led to a decrease in consumer spending and a reduction in economic activity.

4.4 GOVERNMENT MEASURES

The Indian government took several measures to curb inflation in 2013. The Reserve Bank of India (RBI) raised the repo rate and the reverse repo rate, which increased the interest rates, leading to a decrease in consumption and inflation. The government also took

measures to increase the supply of food grains and other essential commodities, which helped to stabilize prices. Additionally, the government increased the import duty on gold and silver to reduce the demand for these commodities, which was contributing to inflation.

4.5 PHILLIPS CURVE

The Phillips curve is an economic concept that describes the inverse relationship between inflation and unemployment. The curve is named after A. William Phillips, who first observed the relationship in the 1950s. The basic idea is that when unemployment is low, wages tend to rise faster, which leads to higher inflation. Conversely, when unemployment is high, wages tend to rise more slowly, which leads to lower inflation.

The Phillips curve is often depicted as a downward sloping curve, with inflation on the vertical axis and unemployment on the horizontal axis. The curve is concave, which means that the relationship between inflation and unemployment is not linear. Instead, the curve becomes flatter as unemployment gets lower, which suggests that the relationship between inflation and unemployment is weaker when unemployment is low.

The Phillips curve was an important concept in macroeconomic policy in the 20th century, as it suggested that policymakers could use monetary and fiscal policy to trade off between inflation and unemployment. For example, if inflation was high, policymakers could raise interest rates to reduce inflation, but this would also lead to higher unemployment. Conversely, if unemployment was high, policymakers could lower interest rates to stimulate the economy and reduce unemployment, but this would also lead to higher inflation.

However, the Phillips curve has been called into question by the stagflation of the 1970s, which saw high inflation and high unemployment at the same time. This led to the development of the natural rate of unemployment hypothesis, which suggests that there is a long-run equilibrium rate of unemployment that is determined by structural factors in the economy, such as demographics, technology, and institutions. In this view, policymakers cannot permanently trade off between inflation and unemployment, as any attempt to do so will eventually lead to higher inflation without reducing unemployment.

Despite these criticisms, the Phillips curve remains a useful concept for understanding the relationship between inflation and unemployment in the short run. However, it is important to recognize that the relationship is not stable over time and may be influenced by a variety of factors, such as changes in consumer and worker expectations.

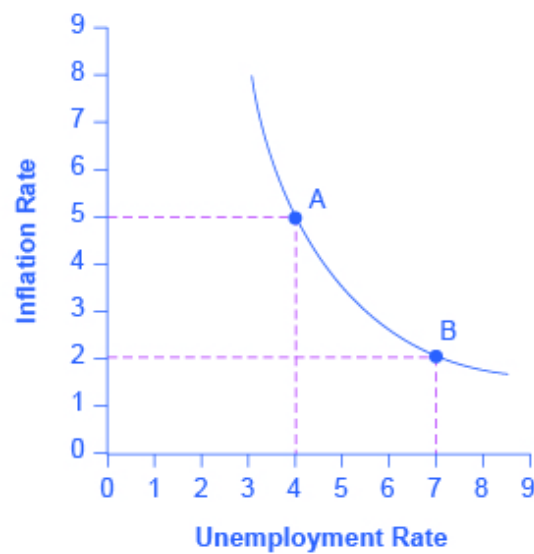


Fig 4.5.1 Phillips Curve

CHAPTER 5

RESULT AND DISCUSSIONS

5.1 CONCLUSION

In conclusion, Inflation had a significant impact on the Indian economy in 2013, leading to a decrease in consumption and economic growth. The high inflation rate was primarily due to the increase in food and fuel prices and the depreciation of the rupee. The government took several measures to control inflation, which helped to stabilize prices to some extent. However, inflation remained a significant challenge for the Indian economy in 2013, and its impact continued to be felt in the following years.

This inflation and unemployment dashboard provides a comprehensive view of two critical economic indicators in India. By tracking the inflation rate and unemployment rate in real-time, the dashboard offers valuable insights into the state of the Indian economy. Rising inflation and unemployment can have significant negative impacts on households, businesses, and the broader economy. The dashboard enables policymakers to identify trends and take timely actions to manage these challenges. It also provides a valuable resource for investors and businesses to make informed decisions about their investments and operations. By leveraging the power of data visualization and analytics, the dashboard offers an intuitive and user-friendly interface that makes it easy to interpret and act on the latest economic trends. Overall, the inflation and unemployment dashboard is a powerful tool for understanding and managing the economic challenges facing India today.

5.2 OUTPUT

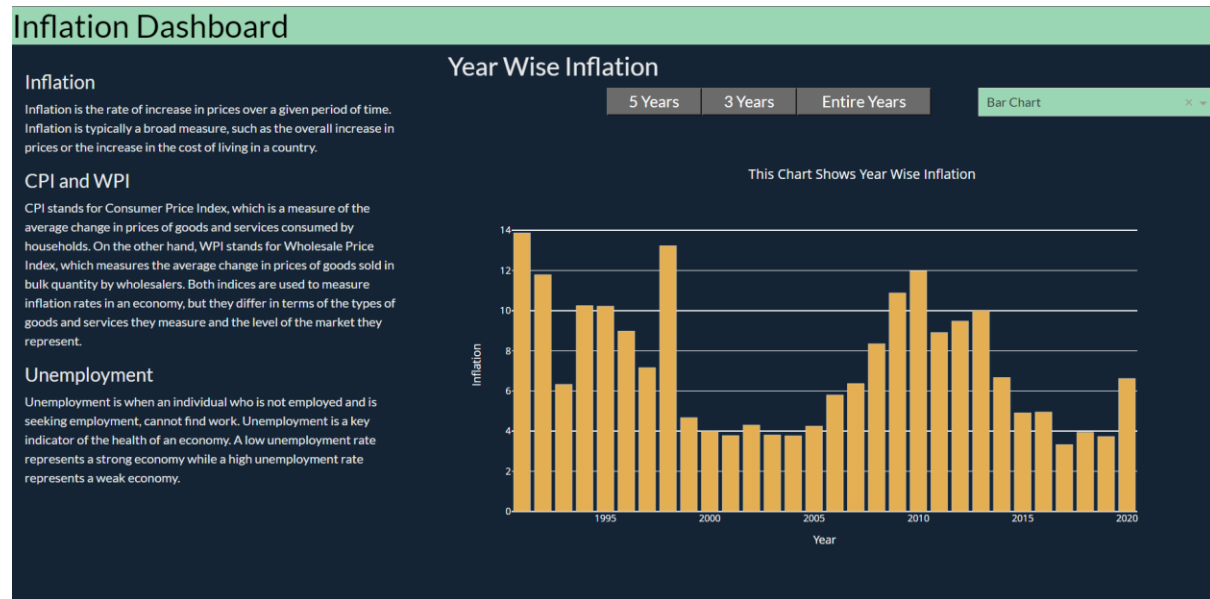


Fig 5.2.1 Bar Chart showing year wise Inflation

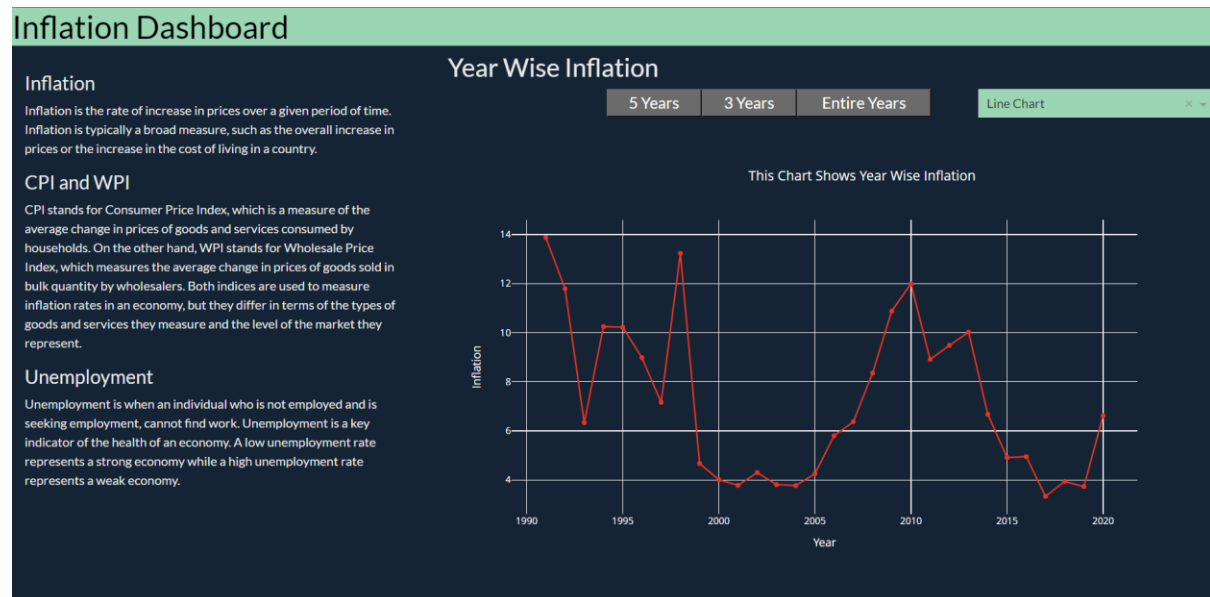


Fig 5.2.2 Line Chart showing year wise Unemployment

Inflation

Inflation is the rate of increase in prices over a given period of time. Inflation is typically a broad measure, such as the overall increase in prices or the increase in the cost of living in a country.

CPI and WPI

CPI stands for Consumer Price Index, which is a measure of the average change in prices of goods and services consumed by households. On the other hand, WPI stands for Wholesale Price Index, which measures the average change in prices of goods sold in bulk quantity by wholesalers. Both indices are used to measure inflation rates in an economy, but they differ in terms of the types of goods and services they measure and the level of the market they represent.

Unemployment

Unemployment is when an individual who is not employed and is seeking employment, cannot find work. Unemployment is a key indicator of the health of an economy. A low unemployment rate represents a strong economy while a high unemployment rate represents a weak economy.

Year Wise Inflation And Unemployment



Fig 5.2.3 Stacked Bar Chart showing year wise Inflation and Unemployment

Inflation

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CPI stands for Consumer Price Index, which is a measure of the average change in prices of goods and services consumed by households. On the other hand, WPI stands for Wholesale Price Index, which measures the average change in prices of goods sold in bulk quantity by wholesalers. Both indices are used to measure inflation rates in an economy, but they differ in terms of the types of goods and services they measure and the level of the market they represent.

Unemployment

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Year Wise Inflation And Unemployment

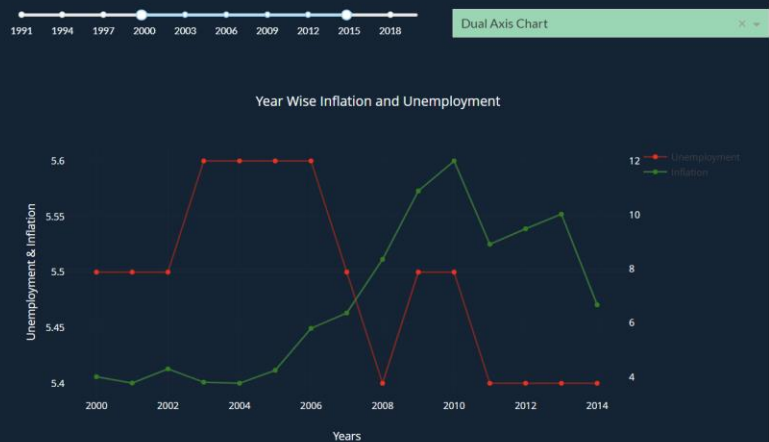


Fig 5.2.4 Dual Axis Line Chart showing year wise Inflation and Unemployment

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APPENDIX

```

import dash

import dash_core_components as dcc

import dash_html_components as html

import pandas as pd

import plotly.express as px

import plotly.graph_objs as go

import dash_table

from dash.dependencies import Input, Output, State

import dash_bootstrap_components as dbc


# Load sample data

data = pd.read_csv("final.csv")

df = pd.read_csv("final.csv")

df_table =pd.read_csv("tabledashdata.csv")


# Initialize Dash app

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        html.P("Inflation is the rate of increase in prices over a given period of time. Inflation
is typically a broad measure, such as the overall increase in prices or the increase in the cost
of living in a country."),

        html.H4("CPI and WPI"),

        html.P('CPI stands for Consumer Price Index, which is a measure of the average
change in prices of goods and services consumed by households. On the other hand, WPI
stands for Wholesale Price Index, which measures the average change in prices of goods sold
in bulk quantity by wholesalers. Both indices are used to measure inflation rates in an
economy, but they differ in terms of the types of goods and services they measure and the
level of the market they represent.'),

        html.H4("Unemployment"),

        html.P('Unemployment is when an individual who is not employed and is seeking
employment, cannot find work. Unemployment is a key indicator of the health of an
economy. A low unemployment rate represents a strong economy while a high
unemployment rate represents a weak economy.'),

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# Add the chart

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# Add a tag that updates when a year range button is clicked

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#stacked

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# Title

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html.Br(),

html.Br(),

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    ],

    value='stacked',

    style={'color': 'black','background-color':'#88d8b0','width':'400px','float':'right'}

),

html.Br(),

```

```

# Range slider to select date range

html.Div([

    dcc.RangeSlider(

        id='date-range',

        min=df['Year'].min(),

        max=df['Year'].max(),

        value=[df['Year'].min(), df['Year'].max()],

        marks={str(date): { 'label' : str(date), 'style':{ 'color':'white','width':'20%' } } for date in
range(1991,2020,3)},

    ),

    style={ 'position':'absolute','left':'550px','width':'550px','top':'830px' }

    ),

    html.Br(),

    html.Br(),

# Graph

dcc.Graph(id='chart',style={ 'position':'absolute','left':'550px','width':'950px','height':'500px' })

]),

#table

dash_table.DataTable(

    id='table',

    columns=[ { "name": i, "id": i } for i in df_table.columns],

    data=df_table.to_dict('records'),

    style_header={

        'backgroundColor': 'rgb(210, 210, 210)',

        'color': 'black',

        'fontWeight': 'bold'

    },

    ],

```

```

style_data={
    'color': 'black',
    'backgroundColor': 'white'
},
style_table={
    'maxHeight': '400px',
    'maxWidth': '500px',
    'overflowY': 'scroll',
    'width': '100%',
    'float': 'right',
    'top': '580px'
},
style_cell={
    'minWidth': '50px', 'maxWidth': '100px',
    'whiteSpace': 'normal',
    'textOverflow': 'ellipsis',
},
)

])

# Define the callbacks for the app
@app.callback(
    [Output('my-chart', 'figure'), Output('button-output', 'children')],
    [
        Input('chart-type', 'value'),
        Input('button-5-years', 'n_clicks'),
    ]
)

```

```

        Input('button-3-years', 'n_clicks'),
        Input('button-all-years', 'n_clicks')
    ],
    [State('button-output', 'children')]
)

def update_chart(chart_type, clicks_5_years, clicks_3_years, clicks_all_years,
button_output):
    # Determine which button was clicked
    ctx = dash.callback_context
    if not ctx.triggered:
        button_id = 'button-all-years'
    else:
        button_id = ctx.triggered[0]['prop_id'].split('.')[0]
    if button_id == 'button-5-years':
        start_year = data['Year'].max() - 4
    elif button_id == 'button-3-years':
        start_year = data['Year'].max() - 2
    else:
        start_year = data['Year'].min()

    # Filter the data to include only the selected years
    filtered_data = data[data['Year'] >= start_year]

    # Create the chart based on the selected chart type
    if chart_type == 'bar':
        fig = px.bar(filtered_data, x='Year', y='Inflation',title='Year Wise
Inflation',color_discrete_sequence=['#edac3b'])
    else:

```

```

fig = px.line(filtered_data, x='Year', y='Inflation',title='Year Wise
Inflation',markers=True,color_discrete_sequence=['red'])

# Modify the size of the chart
fig.update_layout(height=550, width=950,plot_bgcolor='#0f2537',
                    paper_bgcolor='#0f2537',titlefont=dict(color='white'),
                    title= {'text': 'This Chart Shows Year Wise Inflation', 'x': 0.55})
fig.update_xaxes(title_font=dict(color='white'),tickfont=dict(color='white'))
fig.update_yaxes(title_font=dict(color='white'),tickfont=dict(color='white'))

return fig, button_output

# Define Callbacks
@app.callback(
    dash.dependencies.Output('chart', 'figure'),
    [dash.dependencies.Input('chart-type2', 'value'),
     dash.dependencies.Input('date-range', 'value')])
def update_chart(chart_type, date_range):
    filtered_df = df[(df['Year'] >= date_range[0]) & (df['Year'] <= date_range[1])]

    if chart_type == 'stacked':
        data = data = [
            go.Bar(x=filtered_df['Year'], y=filtered_df['unemployment'],
name='Unemployment', marker=dict(color='#8a1e1e')),
            go.Bar(x=filtered_df['Year'], y=filtered_df['Inflation'], name='Inflation',
marker=dict(color='#1a7333'))]

        layout = go.Layout(barmode='stack',
                            title="Year Wise Inflation and Unemployment",

```

```

        plot_bgcolor='#0f2537',
        paper_bgcolor='#0f2537',
        titlefont=dict(color='white'),
        xaxis=dict(title='Years', titlefont=dict(color='white'),
        tickfont=dict(color='white')),
        yaxis=dict(title='Unemployment & Inflation', titlefont=dict(color='white'),
        tickfont=dict(color='white')))

    elif chart_type == 'dual':
        data = [
            go.Scatter(x=filtered_df['Year'], y=filtered_df['unemployment'],
            name='Unemployment',mode='lines+markers', line=dict(color='#8a1e1e'),
            marker=dict(color='red')),
            go.Scatter(x=filtered_df['Year'], y=filtered_df['Inflation'], name='Inflation',
            yaxis='y2',mode='lines+markers', line=dict(color='#1a7333'), marker=dict(color='green'))
        ]
        layout = go.Layout(
            xaxis=dict(title='Years',titlefont=dict(color='white'),tickfont=dict(color='white')),
            yaxis=dict(title='Unemployment &
Inflation',titlefont=dict(color='white'),tickfont=dict(color='white')),
            yaxis2=dict(overlying='y',
            side='right',titlefont=dict(color='white'),tickfont=dict(color='white')),
            title='Year Wise Inflation and Unemployment',
            plot_bgcolor='#0f2537',
            paper_bgcolor='#0f2537',
            titlefont=dict(color='white')
        )

    return {'data': data, 'layout': layout}

```

```
if __name__ == '__main__':  
    app.run_server(debug=False)
```