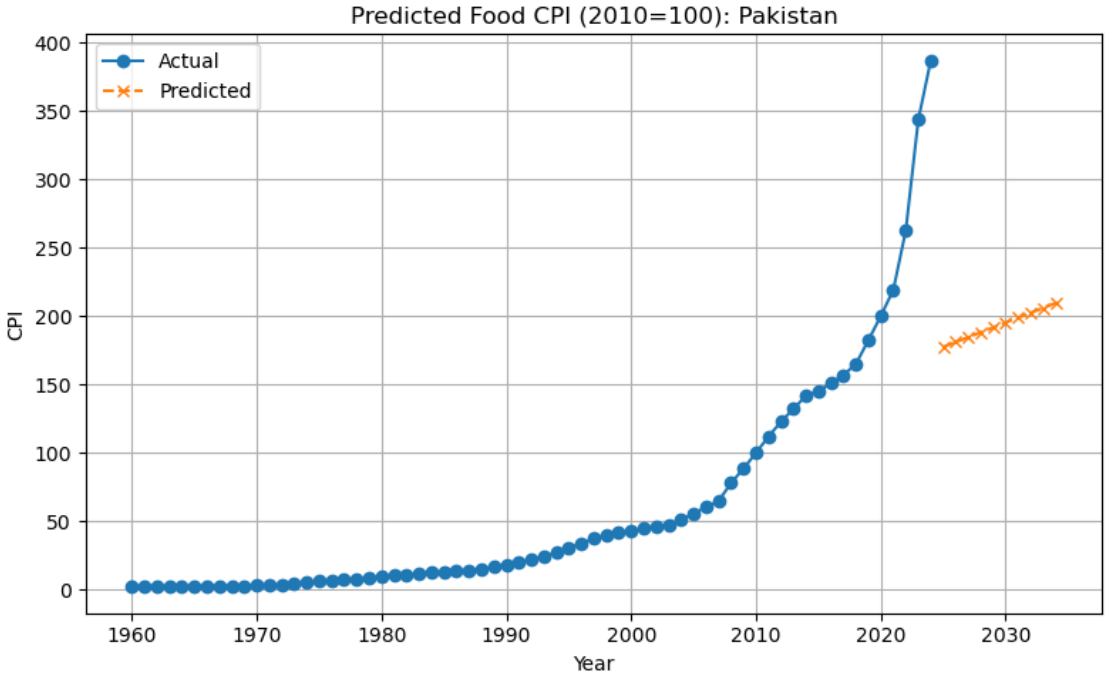
global-food-price-analysis

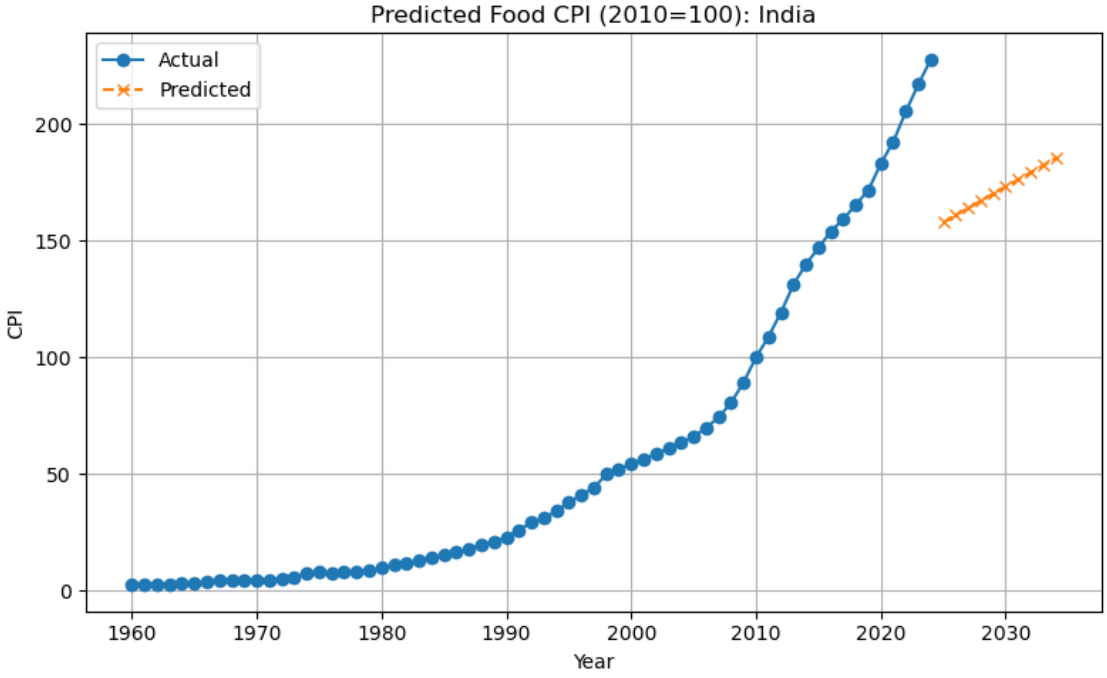
July 29, 2025

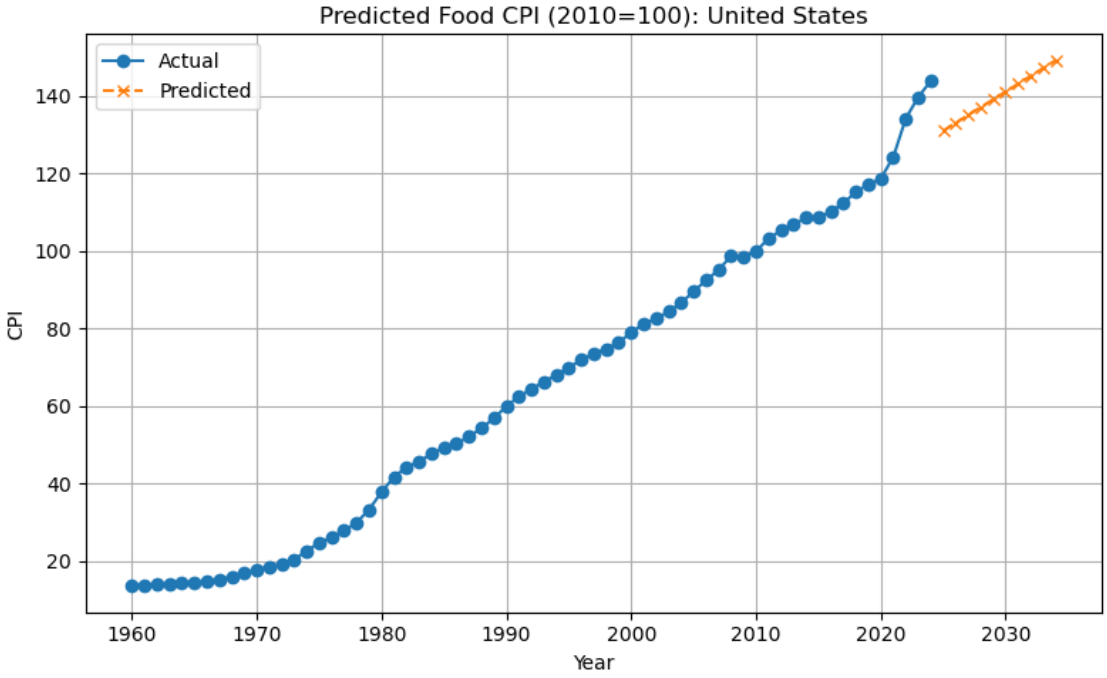
[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import requests
from sklearn.linear_model import LinearRegression

# Countries of interest with ISO codes
countries = {
    "PK": "Pakistan",
    "IN": "India",
    "US": "United States",
    "CN": "China",
    "RU": "Russia",
    "GB": "United Kingdom",
    "WLD": "World"
}

# Function to fetch CPI data from World Bank API
def fetch_worldbank_data():
    all_data = []
    for code, name in countries.items():
        url = f"https://api.worldbank.org/v2/country/{code}/indicator/FP.CPI.
 ↪TOTL?format=json&per_page=1000"
        try:
            r = requests.get(url)
            r.raise_for_status()
            data = r.json()
            if len(data) < 2:
                continue
            for row in data[1]:
                year = int(row['date'])
                value = row['value']
                if value is not None and 1960 <= year <= 2024:
                    all_data.append({"Country": name, "Year": year, "CPI":␣
 ↪value})
        except:
            print(f"Failed to load from API for {name}, skipping.")
```

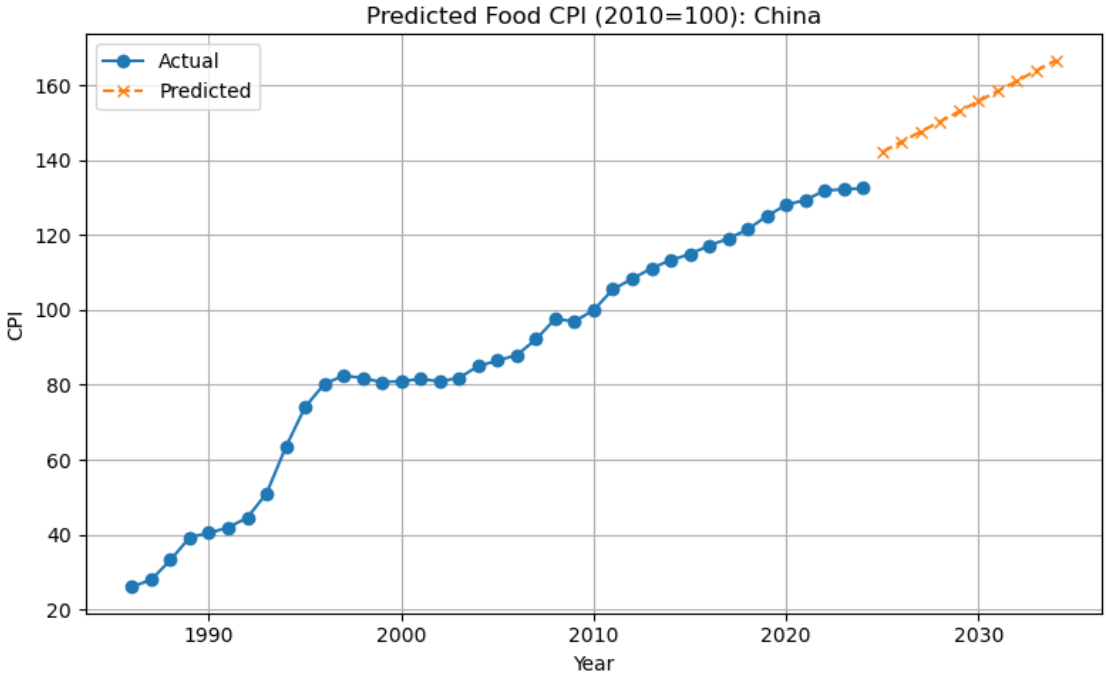
```
    return pd.DataFrame(all_data)

# Step 1: Load data
df = fetch_worldbank_data()
if df.empty:
    raise RuntimeError("Failed to load CPI data from API or CSV fallback.")

# Step 2: Prepare for prediction
future_years = np.arange(2025, 2035)
prediction_df = pd.DataFrame(index=countries.values(), columns=future_years)

# Step 3: Predict CPI for each country
for country in countries.values():
    country_data = df[df["Country"] == country].dropna()

    if len(country_data) < 10:
        print(f"Not enough historical data for {country}, skipping.")
        continue

    country_data = country_data.sort_values("Year")
    X = country_data["Year"].values.reshape(-1, 1)
    y = country_data["CPI"].values

    # Train model
    model = LinearRegression()
    model.fit(X, y)

    # Predict
    future_X = future_years.reshape(-1, 1)
    predictions = model.predict(future_X)

    # Store predictions in the DataFrame
    prediction_df.loc[country] = predictions

    # Plot
    plt.figure(figsize=(8, 5))
    plt.plot(X.flatten(), y, label="Actual", marker='o')
    plt.plot(future_years, predictions, label="Predicted", linestyle='--',␣
 ↪marker='x')
    plt.title(f"Predicted Food CPI (2010=100): {country}")
    plt.xlabel("Year")
    plt.ylabel("CPI")
    plt.grid(True)
    plt.legend()
    plt.tight_layout()
    plt.show()
```

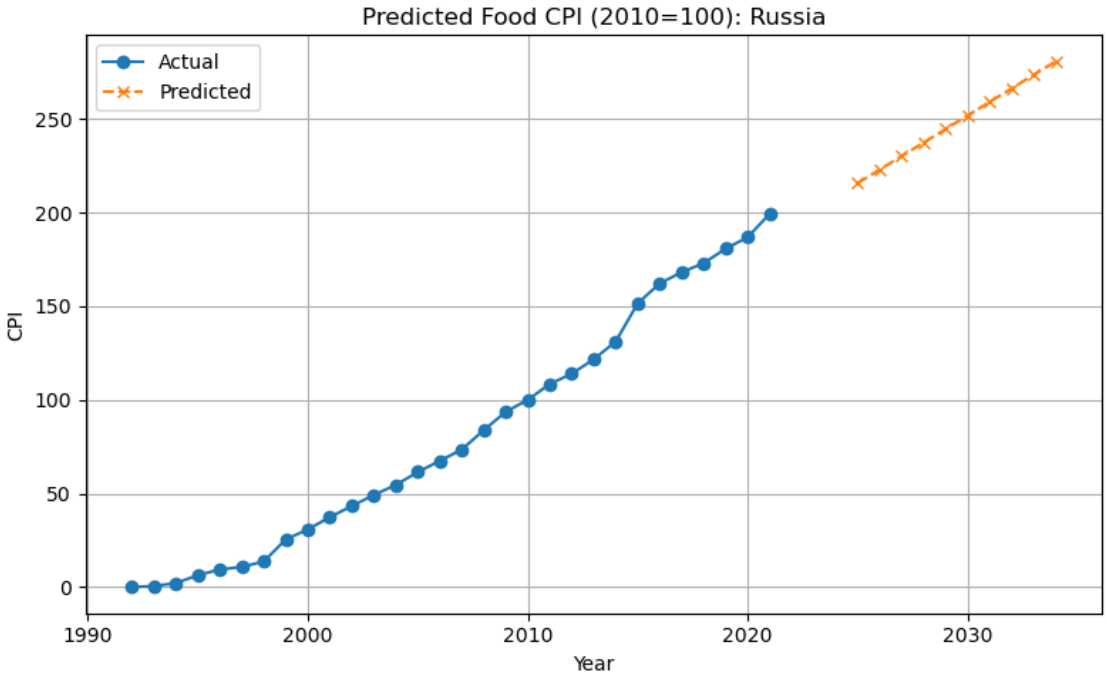
```
# Step 4: Display prediction table
pd.set_option("display.float_format", "{:.2f}".format)
print("Future CPI Predictions (2025-2034):")
prediction_df
```

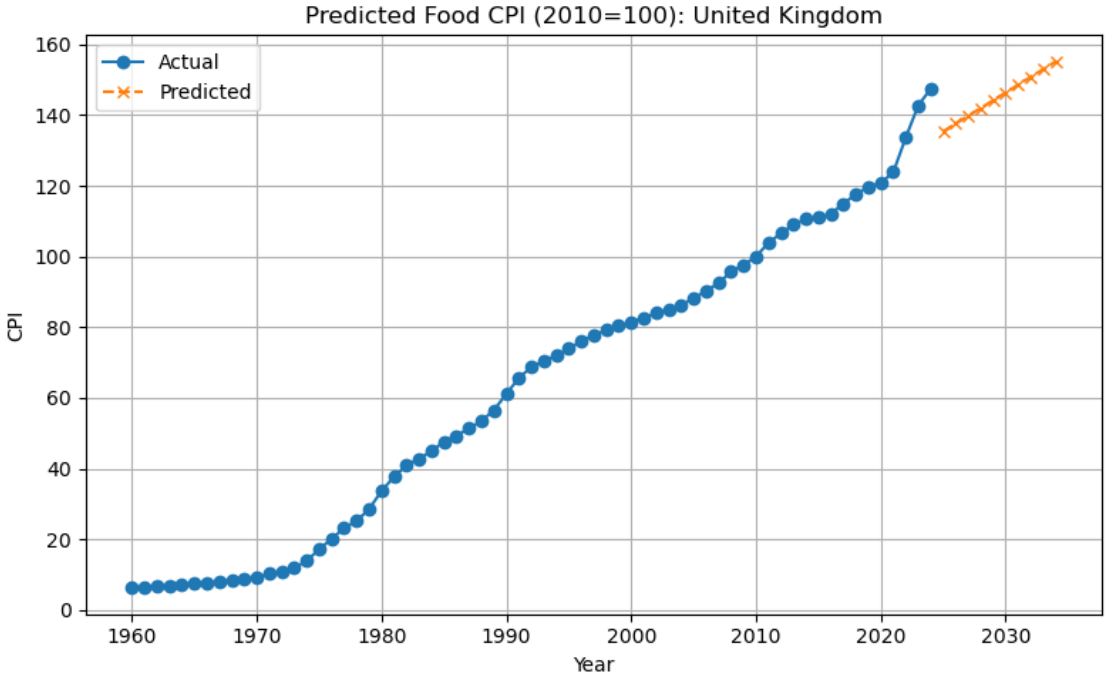





Predicted Food CPI (2010=100): United States
Actual
Predicted
CPI
Year
20
40
60
80
100
120
140
1960
1970
1980
1990
2000
2010
2020
2030


Predicted Food CPI (2010=100): China
Actual
Predicted
CPI
Year
20
40
60
80
100
120
140
160
1990
2000
2010
2020
2030





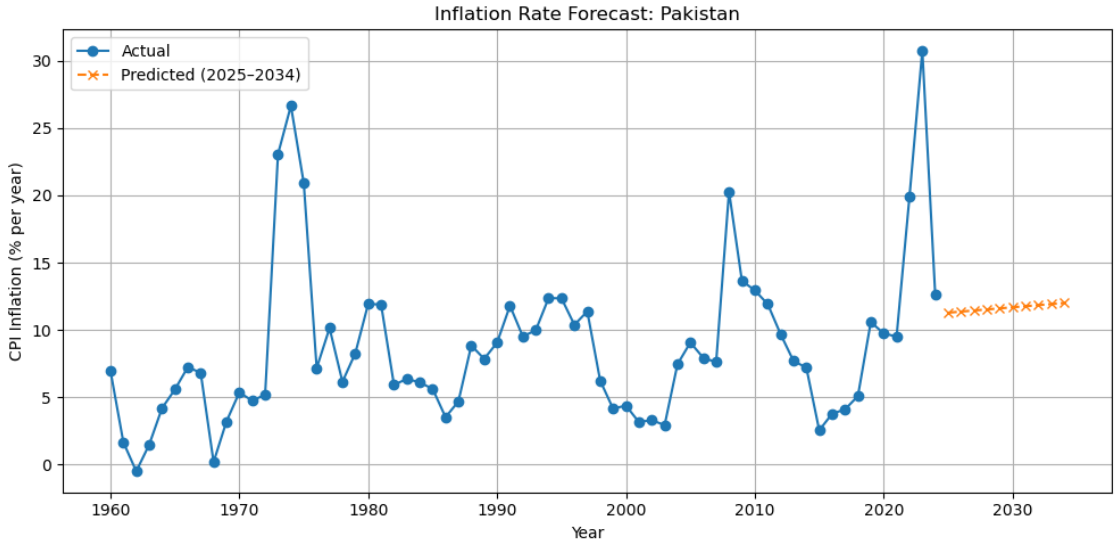
Not enough historical data for World, skipping.
Future CPI Predictions (2025-2034):

[1]:
```
                  2025   2026   2027   2028   2029   2030   2031   2032   2033  \
Pakistan        177.43 180.99 184.55 188.11 191.67 195.23 198.78 202.34 205.90
India           157.80 160.85 163.90 166.95 170.00 173.05 176.10 179.14 182.19
United States   131.02 133.04 135.05 137.07 139.09 141.10 143.12 145.14 147.15
China           142.21 144.93 147.64 150.36 153.07 155.79 158.50 161.22 163.93
Russia          215.71 222.94 230.17 237.39 244.62 251.85 259.08 266.30 273.53
United Kingdom  135.36 137.56 139.75 141.95 144.15 146.35 148.54 150.74 152.94
World             NaN    NaN    NaN    NaN    NaN    NaN    NaN    NaN    NaN

                  2034
Pakistan        209.46
India           185.24
United States   149.17
China           166.64
Russia          280.76
United Kingdom  155.14
World             NaN
```

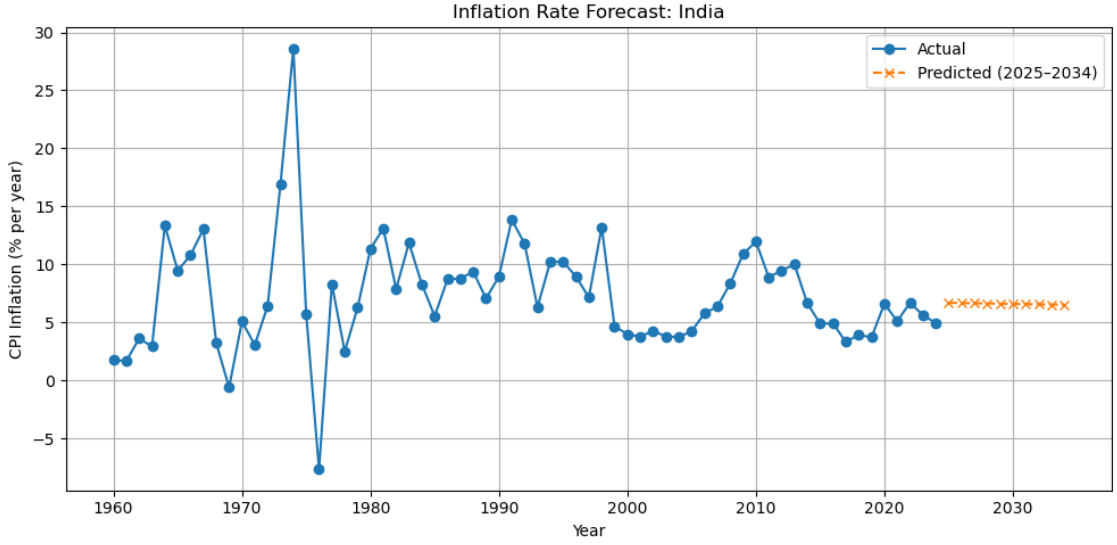
[2]:
```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression

# === Step 1: Load CSV ===
csv_file = r"C:\Users\mugha\PycharmProjects\JupyterProject\API_FP.CPI.TOTL.
 ↪ZG_DS2_en_csv_v2_122376.csv"

# Load and clean
raw_df = pd.read_csv(csv_file, skiprows=4)
years = [str(y) for y in range(1960, 2025)]
raw_df = raw_df[["Country Name"] + years]
raw_df.dropna(subset=years, how='all', inplace=True)
raw_df.set_index("Country Name", inplace=True)
raw_df = raw_df.transpose()
raw_df.index = raw_df.index.astype(int)

# === Step 2: Select Countries ===
countries = {
    "Pakistan": "PK",
    "India": "IN",
    "United States": "US",
    "China": "CN",
    "Russian Federation": "RUS",
    "United Kingdom": "GB",
    "World": "WLD"
}
```

```
future_years = np.arange(2025, 2035)
prediction_df = pd.DataFrame(index=countries.keys(), columns=future_years)

# === Step 3: Predict & Plot ===
for country in countries.keys():
    if country not in raw_df.columns:
        print(f"  {country} data not found, skipping.")
        continue

    country_data = raw_df[country].dropna()
    if len(country_data) < 10:
        print(f"  Not enough data for {country}, skipping.")
        continue

    X = country_data.index.values.reshape(-1, 1)
    y = country_data.values

    model = LinearRegression()
    model.fit(X, y)

    future_preds = model.predict(future_years.reshape(-1, 1))

    # Save predictions in the DataFrame
    prediction_df.loc[country] = [round(p, 2) for p in future_preds]

    # Print predicted values
    print("\nPredicted Inflation Rate for", country)
 #   print("Year\tInflation %")
 #   for year, pred in zip(future_years, future_preds):
 #       print(f"{year}\t{pred:.2f}")

    # Plot
    plt.figure(figsize=(10, 5))
    plt.plot(X.flatten(), y, label="Actual", marker='o')
    plt.plot(future_years, future_preds, label="Predicted (2025-2034)",␣
 ↪linestyle='--', marker='x')
    plt.title(f"Inflation Rate Forecast: {country}")
    plt.xlabel("Year")
    plt.ylabel("CPI Inflation (% per year)")
    plt.grid(True)
    plt.legend()
    plt.tight_layout()
    plt.show()

# === Step 4: Final Table ===
print("\n Prediction Table (CPI Inflation %):")
prediction_df
```

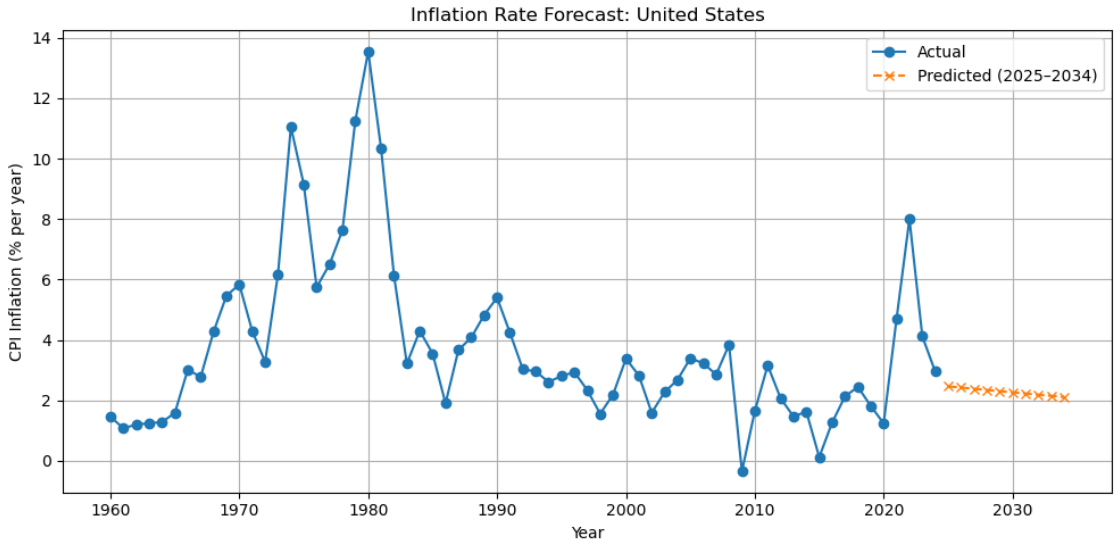
Predicted Inflation Rate for Pakistan



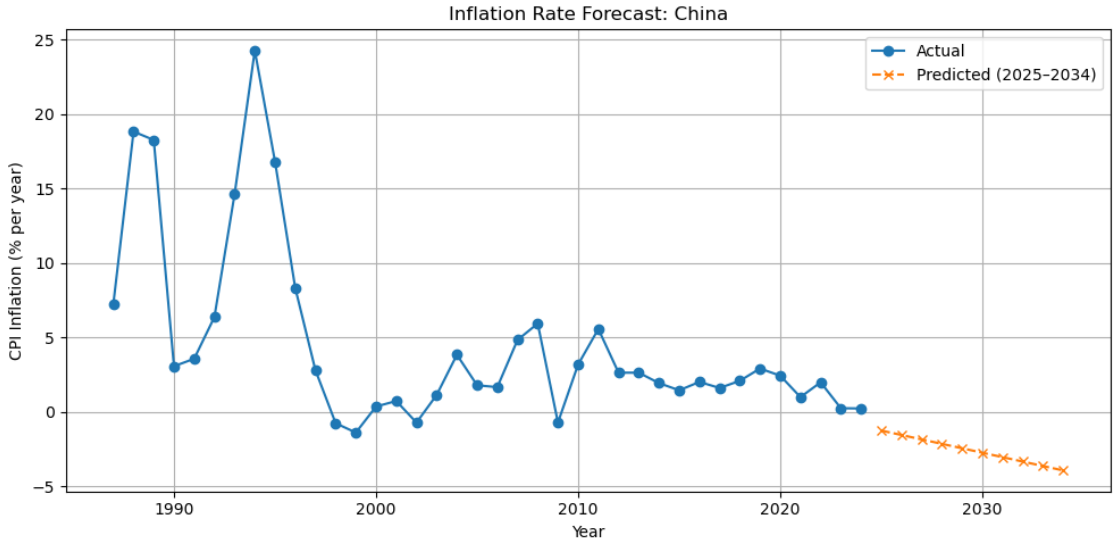
Predicted Inflation Rate for India



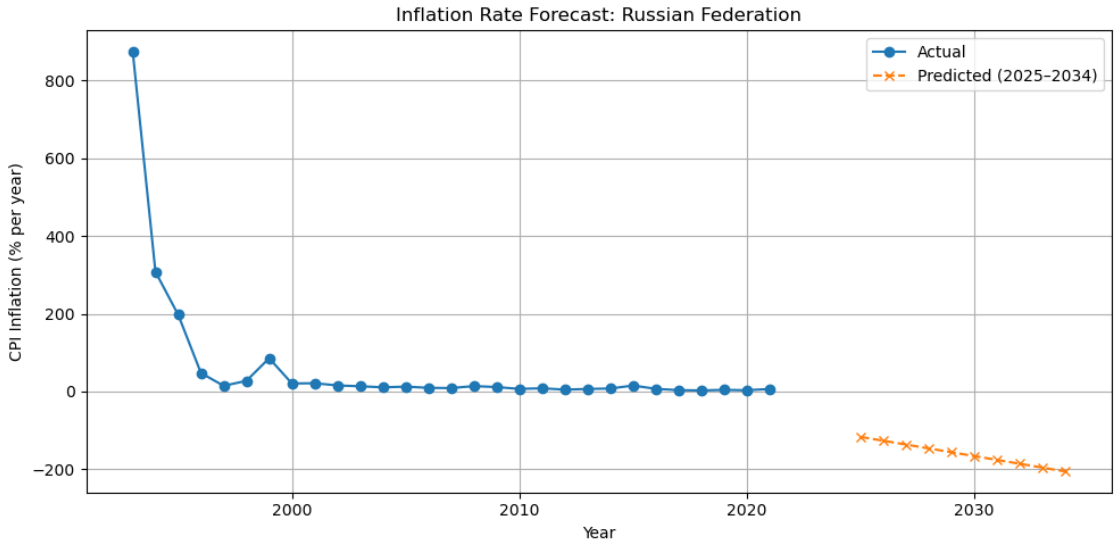
Predicted Inflation Rate for United States



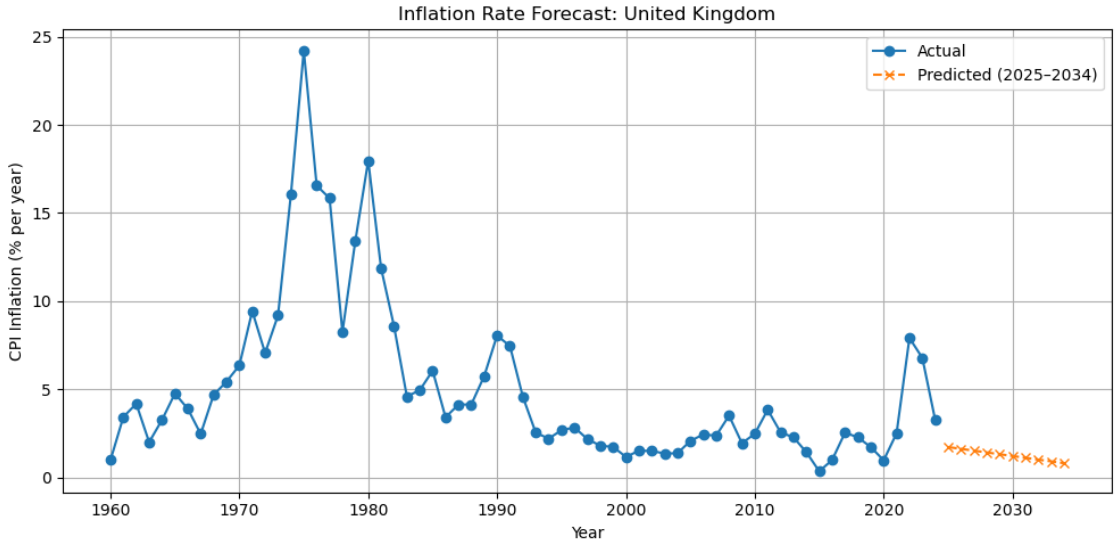
Predicted Inflation Rate for China



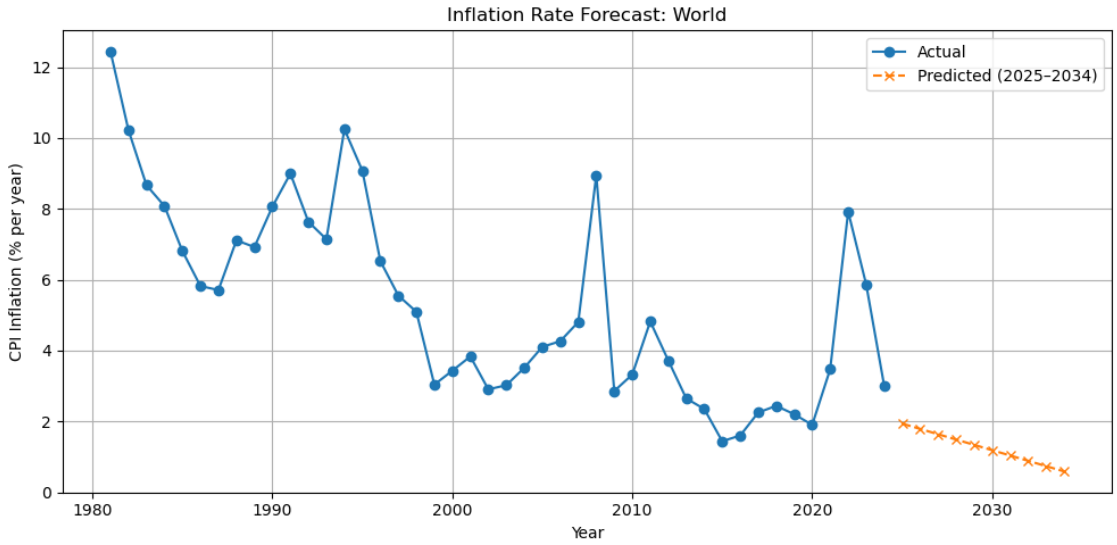
Predicted Inflation Rate for Russian Federation



Predicted Inflation Rate for United Kingdom



Predicted Inflation Rate for World



Prediction Table (CPI Inflation %):

[2]:

	2025	2026	2027	2028	2029	2030	2031	\
Pakistan	11.28	11.36	11.44	11.52	11.60	11.68	11.76	
India	6.70	6.68	6.66	6.65	6.63	6.61	6.59	
United States	2.46	2.42	2.38	2.34	2.30	2.26	2.22	
China	-1.27	-1.56	-1.86	-2.16	-2.46	-2.75	-3.05	
Russian Federation	-116.47	-126.34	-136.21	-146.07	-155.94	-165.81	-175.68	
United Kingdom	1.74	1.64	1.54	1.44	1.33	1.23	1.13	
World	1.94	1.79	1.64	1.49	1.34	1.19	1.04	

	2032	2033	2034
Pakistan	11.84	11.92	12.00
India	6.57	6.55	6.54
United States	2.19	2.15	2.11
China	-3.35	-3.65	-3.94
Russian Federation	-185.55	-195.42	-205.28
United Kingdom	1.03	0.93	0.83
World	0.89	0.74	0.59

[ ]: