# Commodity Price Changes in Gaza

In [395…
```
# Step 1: Import the necessary libraries
import pandas as pd
import matplotlib.pyplot as plt
```

In [396…
```
# Step 2: Load the dataset
file_path = 'C:/Users/faraz/Downloads/Niksun/ml_datasets/War_21st Century_Is
commodity_data = pd.read_excel(file_path)


commodity_data.head()
```

Out[396…

| | Unnamed: 0 | commodity name (arabic) | amount (arabic) | commodity name (english) | amount (english) | average price before 7 October 2023 | avera price aft 7 Octob 20 |
|---|---|---|---|---|---|---|---|
| **0** | 11100102 | أرز حبة طويلة الياسمين تايلند - 1 كغم | 1 كغم | rice (1 kg) | 1 kg | 7.727273 | 9.0000 |
| **1** | 11100206 | طحين أبيض - مطاحن السلام - محلي | 50 كغم | flour (50 kg) | 50 kg | 91.000000 | 150.0000 |
| **2** | 11100301 | خبز ابيض كماج- محلي | 1 كغم | bread (3 kg) | 3 kg | 7.000000 | 8.0000 |
| **3** | 11220102 | دجاج طازج دون الريش - محلي | 1 كغم | chickens (1 kg) | 1 kg | 16.000000 | 16.6153 |
| **4** | 11430001 | بيض دجاج أبيض - محلي | كرتونة / 2 كغم | eggs (2 kg) | 2 kg | 13.333333 | 18.0000 |

5 rows × 21 columns

## Step 3: Preprocess the data

We will check for missing values, handle them, and make sure the 'Date' column is in datetime format.

In [397…
```
print(commodity_data.columns)
```

```
Index([                          'Unnamed: 0',
                    'commodity name (arabic)',
                            'amount (arabic)',
                   'commodity name (english)',
                           'amount (english)',
        'average price before 7 October 2023',
         'average price after 7 October 2023',
         'Monthly Percent Change % (Oct-Sep)',
                         2023-11-01 00:00:00,
       'Monthly Percent Change % (Nov.-Oct.)',
                         2023-12-01 00:00:00,
         'Monthly Percent Change % (Nov-Dec)',
                         2024-01-01 00:00:00,
         'Monthly Percent Change % (Dec-Jan)',
                         2024-02-01 00:00:00,
         'Monthly Percent Change % (Jan-Feb)',
                         2024-03-01 00:00:00,
         'Monthly Percent Change % (Feb-Mar)',
                         2024-04-01 00:00:00,
         'Monthly Percent Change % (Mar-Apr)',
                        'Acumulative change'],
      dtype='object')
```

In [398…

```
# Checking for missing values
commodity_data.isnull().sum()
```

Out[398…

```
Unnamed: 0                              0
commodity name (arabic)                 0
amount (arabic)                         0
commodity name (english)                0
amount (english)                        0
average price before 7 October 2023     0
average price after 7 October 2023      0
Monthly Percent Change % (Oct-Sep)      0
2023-11-01 00:00:00                     0
Monthly Percent Change % (Nov.-Oct.)    0
2023-12-01 00:00:00                     0
Monthly Percent Change % (Nov-Dec)      0
2024-01-01 00:00:00                     0
Monthly Percent Change % (Dec-Jan)      0
2024-02-01 00:00:00                     0
Monthly Percent Change % (Jan-Feb)      0
2024-03-01 00:00:00                     0
Monthly Percent Change % (Feb-Mar)      0
2024-04-01 00:00:00                     0
Monthly Percent Change % (Mar-Apr)      0
Acumulative change                      0
dtype: int64
```

In [399…

```
# Dropping the 'commodity name (arabic)',amount arabic column
commodity_data = commodity_data.drop(columns=['Unnamed: 0','commodity name (
commodity_data.head()

#Removing Extra Information from Commodity Name
commodity_data['commodity name (english)'] = commodity_data['commodity name
```

```
# Reassign the full column names manually
commodity_data.columns = ['Commodity Name', 'Amount', 'Price-7th October',
                          'average price after 7 October 2023', 'Monthly Per
                          'Nov-23', 'Monthly Percent Change % (Nov-Oct)', 'D
                          'Monthly Percent Change % (Nov-Dec)', 'Jan-24',
                          'Monthly Percent Change % (Dec-Jan)', 'Feb-24',
                          'Monthly Percent Change % (Jan-Feb)', 'Mar-24',
                          'Monthly Percent Change % (Feb-Mar)', 'Apr-24',
                          'Monthly Percent Change % (Mar-Apr)', 'Acumulative
#Display DataFrame
commodity_data.head(10)
```

Out[399…

| | Commodity Name | Amount | Price-7th October | average price after 7 October 2023 | Monthly Percent Change % (Oct-Sep) | Nov-23 | Month Perce Change (Nov-O |
|---|---|---|---|---|---|---|---|
| **0** | rice | 1 kg | 7.727273 | 9.000000 | 0.164706 | 8.938776 | -6.80272 |
| **1** | flour | 50 kg | 91.000000 | 150.000000 | 0.648352 | 204.375000 | 3.62500 |
| **2** | bread | 3 kg | 7.000000 | 8.000000 | 0.142857 | 8.000000 | -1.27897 |
| **3** | chickens | 1 kg | 16.000000 | 16.615385 | 0.038462 | 21.000000 | 2.63888 |
| **4** | eggs | 2 kg | 13.333333 | 18.000000 | 0.350000 | 31.250000 | 7.36111 |
| **5** | oil | 3 liters | 30.400000 | 33.846154 | 0.113360 | 38.000000 | 1.22727 |
| **6** | lemons | 1 kg | 2.562500 | 4.979167 | 0.943089 | 4.000000 | -1.96652 |
| **7** | apples | 1 kg | 4.875000 | 7.000000 | 0.435897 | 5.468750 | -2.18750 |
| **8** | tomatoes | 1 kg | 5.000000 | 6.750000 | 0.350000 | 5.125000 | -2.40740 |
| **9** | zucchinis | 1 kg | 3.875000 | 5.875000 | 0.516129 | 4.000000 | -3.19148 |

## Step 4: Add New Features

We will create new features like moving averages and price changes to better understand the trends.

In [400…

```
    # Calculate the overall price change from before and after 7 October 202
    commodity_data['% Sept-Oct'] = ((commodity_data['average price after 7 O
                                                           commodity_data['P
                                                           commodity_data['P

    commodity_data['% Oct-Nov'] = ((commodity_data['Nov-23'] -
                                                 commodity_data['average pri
                                                 commodity_data['average pri

    commodity_data['% Nov-Dec'] = ((commodity_data['Dec-23'] -
                                                           commodity_data['N
                                                           commodity_data['N

    commodity_data['% Dec-Jan'] = ((commodity_data['Jan-24'] -
                                                           commodity_data['D
                                                           commodity_data['D

    commodity_data['% Jan-Feb'] = ((commodity_data['Feb-24'] -
                                                           commodity_data['J
                                                           commodity_data['J
    commodity_data['% Feb-Mar'] = ((commodity_data['Mar-24'] -
                                                           commodity_data['F
                                                           commodity_data['F
    commodity_data['% March-April'] = ((commodity_data['Apr-24'] -
                                                           commodity_data['M
                                                           commodity_data['M

    # Display the updated dataframe with the new price change feature
    commodity_price_change =commodity_data[['Commodity Name','Amount','Price

    commodity_price_change.head(10)
```

Out[400…

| | Commodity Name | Amount | Price-7th October | % Sept-Oct | % Oct-Nov | % Nov-Dec | % D |
|---|---|---|---|---|---|---|---|
| **0** | rice | 1 kg | 7.727273 | 16.470588 | -6.802721e-01 | 44.748858 | 0. |
| **1** | flour | 50 kg | 91.000000 | 64.835165 | 3.625000e+01 | 303.669725 | 24. |
| **2** | bread | 3 kg | 7.000000 | 14.285714 | -1.332268e-13 | 0.000000 | -25. |
| **3** | chickens | 1 kg | 16.000000 | 3.846154 | 2.638889e+01 | 39.682540 | 0. |
| **4** | eggs | 2 kg | 13.333333 | 35.000000 | 7.361111e+01 | 92.000000 | -10. |
| **5** | oil | 3 liters | 30.400000 | 11.336032 | 1.227273e+01 | 62.280702 | 50. |
| **6** | lemons | 1 kg | 2.562500 | 94.308943 | -1.966527e+01 | 66.666667 | 27. |
| **7** | apples | 1 kg | 4.875000 | 43.589744 | -2.187500e+01 | 0.000000 | 357. |
| **8** | tomatoes | 1 kg | 5.000000 | 35.000000 | -2.407407e+01 | 31.707317 | -21. |
| **9** | zucchinis | 1 kg | 3.875000 | 51.612903 | -3.191489e+01 | 50.000000 | 0. |

In [404…

```
# Calculate the standard deviation (volatility) of the monthly prices for ea
month_columns = ['Nov-23','Dec-23','Jan-24','Feb-24','Mar-24','Apr-24']
commodity_data['Price Volatility'] = commodity_data[month_columns].std(axis=

# Display the price volatility
commodity_data[['Commodity Name', 'Price Volatility']].head(20)
```

Out[404…

| | Commodity Name | Price Volatility |
|---|---|---|
| **0** | rice | 1.632993 |
| **1** | flour | 328.576574 |
| **2** | bread | 1.496698 |
| **3** | chickens | 3.402069 |
| **4** | eggs | 33.503731 |
| **5** | oil | 22.602631 |
| **6** | lemons | 6.425301 |
| **7** | apples | 11.178069 |
| **8** | tomatoes | 1.988656 |
| **9** | zucchinis | 6.644076 |
| **10** | eggplants | 3.913444 |
| **11** | chili pepper | 8.321658 |
| **12** | bell pepper | 5.347486 |
| **13** | cucumbers | 2.709551 |
| **14** | dry onions | 13.828315 |
| **15** | potato | 2.960230 |
| **16** | mineral water bottle | 0.270994 |
| **17** | gasoline | 60.089295 |
| **18** | diesel | 2.352107 |
| **19** | passenger travel expenses | 0.000000 |

In [405…

```
# Define a dictionary to group commodities (you can adjust this to fit your
commodity_groups = {
    'rice': 'grains',
    'flour': 'grains',
    'bread': 'grains',
    'chickens': 'proteins',
    'eggs': 'proteins',
    'oil': 'oils',
    'lemons': 'fruits',
    'apples': 'fruits',
    'tomatoes': 'vegetables',
    'zucchinis': 'vegetables',
    'eggplants': 'vegetables',
    'chili pepper': 'vegetables',
    'bell pepper': 'vegetables',
    'cucumbers': 'vegetables',
    'dry onions': 'vegetables',
    'potato': 'vegetables',
    'mineral water bottle': 'beverages',
    'gasoline': 'fuel',
    'diesel': 'fuel',
    'passenger travel expenses (north to the center)': 'services',
    'passenger travel expenses (north to the south)': 'services',
    'biscuits': 'snacks',
    'Crushed bulgur': 'grains',
    'Crushed dry freekeh': 'grains',
    'Fresh Veal': 'proteins',
    'Fresh Lamb With Bone': 'proteins',
    'Baby Milk Powder': 'dairy',
    'Cheese': 'dairy',
    'Pure white sugar': 'sweets',
    'White Table Salt': 'condiments',
    'white yeast': 'baking essentials',
    'Ground coffee': 'beverages',
    'White Canned Cooked Beans': 'canned foods',
    'Egyptian beans medames': 'grains',
    'crushed red lentils': 'grains',
    'Tomato Paste': 'canned foods',
    'Marlboro Cigarettes': 'tobacco',
    'L-M cigarettes': 'tobacco',
    'Gas Cylinder': 'fuel',
    'Potable water distributed using tankers ': 'water distribution',
    'Potable water distributed using tankers': 'water distribution',
    'Potable water distributed using tankers ': 'water distribution'
}


# Apply the commodity grouping based on the cleaned commodity names
commodity_data['Commodity Group'] = commodity_data['Commodity Name'].map(com

# Display the grouped data
commodity_data[['Commodity Name', 'Commodity Group']].head(10)
```

Out[405…

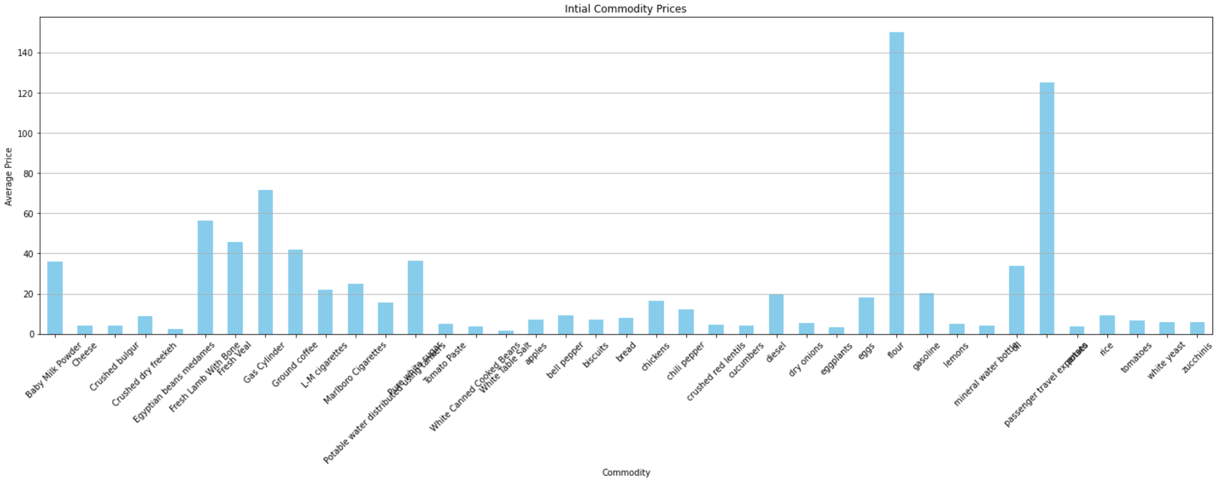
| | Commodity Name | Commodity Group |
|---|---|---|
| **0** | rice | grains |
| **1** | flour | grains |
| **2** | bread | grains |
| **3** | chickens | proteins |
| **4** | eggs | proteins |
| **5** | oil | oils |
| **6** | lemons | fruits |
| **7** | apples | fruits |
| **8** | tomatoes | vegetables |
| **9** | zucchinis | vegetables |

## Step 5: Visualize the Data

Now, we will create 5 different visualizations to explore the commodity price trends.

In [403…

```python
import matplotlib.pyplot as plt
import pandas as pd

# Assuming commodity_data is your dataframe

# Calculating the average price of each commodity
average_prices = commodity_data.groupby('Commodity Name')['average price aft

# Plotting the bar chart for average prices of each commodity
plt.figure(figsize=(20, 8))
average_prices.plot(kind='bar', color='skyblue')

plt.title('Intial Commodity Prices')
plt.xlabel('Commodity')
plt.ylabel('Average Price')
plt.xticks(rotation=45)
plt.grid(axis='y')

plt.tight_layout()
plt.show()
```



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