



CPI AND NATURAL GAS PRICES

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DATASET OVERVIEW & KEY QUESTIONS

KEY RESEARCH QUESTIONS:

- HOW DO FLUCTUATIONS IN NATURAL GAS PRICES IMPACT OVERALL INFLATION TRENDS?
- WHAT IS THE STATISTICAL RELATIONSHIP BETWEEN CPI AND NATURAL GAS PRICES OVER TIME?
- HOW CAN UNDERSTANDING THIS RELATIONSHIP HELP PREDICT FUTURE ECONOMIC CONDITIONS?

VARIABLES OF INTEREST:

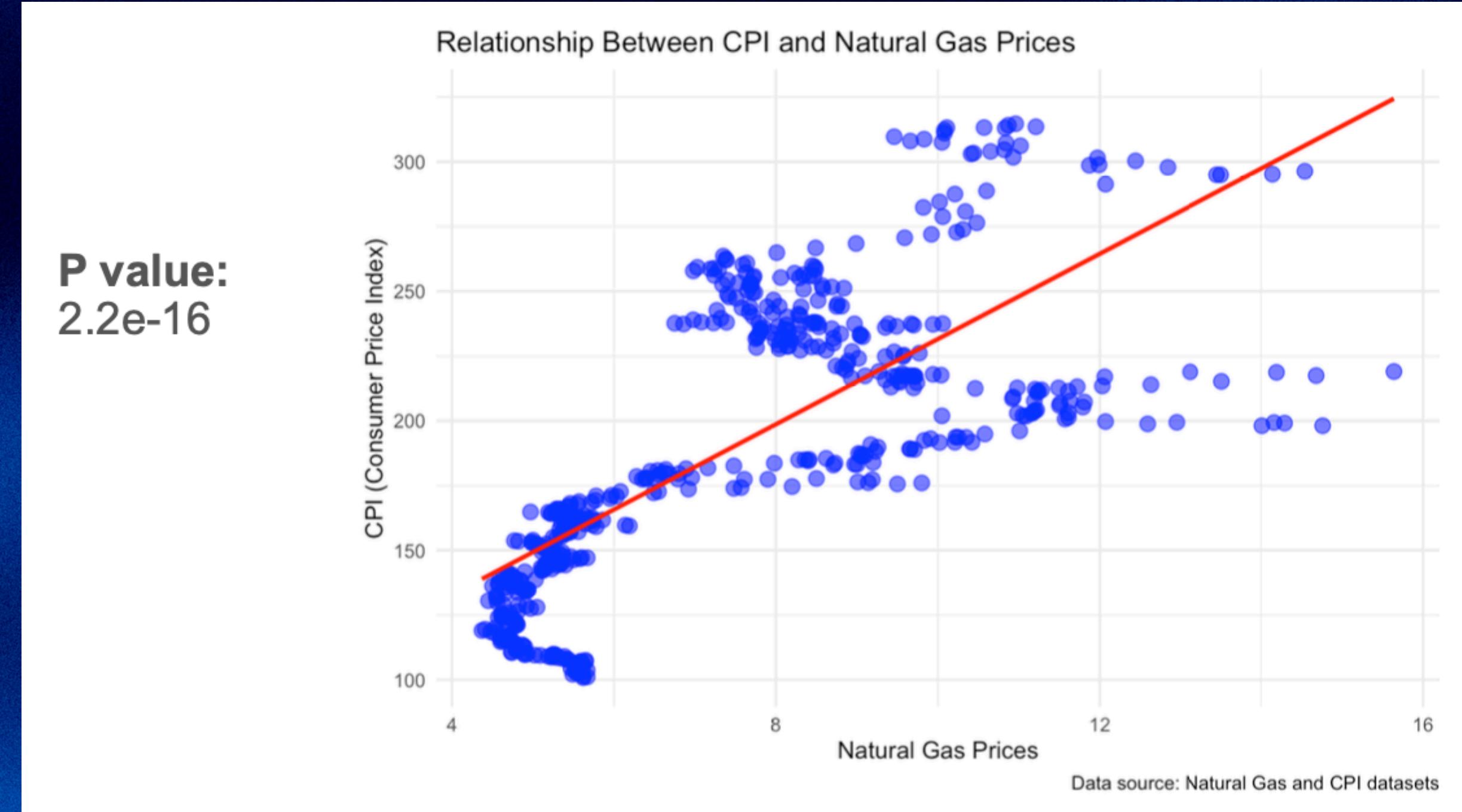
- CONSUMER PRICE INDEX (CPI) – MEASURES CHANGES IN THE AVERAGE PRICE LEVEL OF CONSUMER GOODS AND SERVICES, SERVING AS A PRIMARY INDICATOR OF INFLATION.
- NATURAL GAS PRICES – A CRITICAL COMPONENT OF ENERGY COSTS THAT DIRECTLY AFFECTS PRODUCTION EXPENSES, TRANSPORTATION, AND HOUSEHOLD EXPENDITURES.

SIGNIFICANCE OF THE STUDY:

- ENERGY COSTS ARE A MAJOR DRIVER OF INFLATION DUE TO THEIR IMPACT ON MANUFACTURING, SUPPLY CHAINS, AND CONSUMER SPENDING.
- IDENTIFYING CORRELATIONS BETWEEN CPI AND NATURAL GAS PRICES CAN PROVIDE INSIGHTS INTO ECONOMIC STABILITY AND POLICYMAKING.
- UNDERSTANDING THESE DYNAMICS CAN HELP BUSINESSES, POLICYMAKERS, AND INVESTORS MAKE DATA-DRIVEN DECISIONS IN RESPONSE TO MARKET FLUCTUATIONS.

VISUALIZATION AND SUMMARY STATISTICS

P value:
2.2e-16



PARAMETERS & TESTING

01

Parameters:

- Natural Gas Prices (Monthly) – Monthly average gas prices for commercial consumers, reflecting energy cost fluctuations over time.
- Consumer Price Index (Monthly) – Measures the price changes of a basket of goods and services (food, clothing, shelter, fuel, transportation, services, and sales taxes), covering 88% of the U.S. population.

02

Testing Methodology:

- Two-Sample t-Test – Conducted on the merged dataset to determine if there is a statistically significant difference between CPI and natural gas price fluctuations.
- Confidence Level: 95%
- Objective: Assess whether changes in natural gas prices have a meaningful impact on inflation trends.

OUR FINDINGS & INSIGHTS

Natural Gas Prices Influence Inflation Trends

- Energy costs drive production, transportation, and household expenses, leading to price increases in various sectors.
- Rising gas prices are often correlated with higher CPI levels, reinforcing their role in inflationary pressure.

Statistical Relationship: Significant & Correlated

- Two-Sample t-Test results led to the rejection of the null hypothesis, confirming a statistical link between natural gas prices and CPI.
- Changes in natural gas prices often precede shifts in inflation, suggesting a potential leading indicator.

PREDICTING FUTURE ECONOMIC CONDITIONS

- UNDERSTANDING THIS RELATIONSHIP HELPS POLICYMAKERS AND INVESTORS ANTICIPATE INFLATIONARY TRENDS.
- INCORPORATING REGIONAL AND GLOBAL FACTORS, ALONG WITH TIME-SERIES FORECASTING, CAN IMPROVE ECONOMIC PREDICTIONS.



DISCUSSION

Findings:

- The null hypothesis was rejected, indicating a statistically significant relationship between natural gas prices and CPI.
- This suggests that fluctuations in natural gas prices contribute to overall inflation trends.

Shortcomings & Limitations:

- Multiple influencing factors: CPI and natural gas prices are affected by various external variables, such as supply chain disruptions, monetary policies, and geopolitical events.
- Assumption of independence: The analysis assumes that CPI and natural gas prices are independent, but in reality, they may be interconnected through broader economic mechanisms.
- Potential lag effects: The study does not account for possible time-lag effects in the relationship between natural gas prices and inflation.

FUTURE RESEARCH DIRECTIONS:

- IMPACT OF MAJOR ECONOMIC EVENTS: EXAMINING HOW GLOBAL CRISES, POLICY CHANGES, AND ENERGY MARKET SHIFTS AFFECT THE CPI-NATURAL GAS PRICE RELATIONSHIP.
- REGIONAL VARIATIONS: INVESTIGATING DIFFERENCES IN INFLATION SENSITIVITY TO ENERGY PRICES ACROSS DIFFERENT STATES OR COUNTRIES.
- TIME SERIES ANALYSIS & FORECASTING: APPLYING ADVANCED MODELS TO ANALYZE TRENDS OVER TIME AND PREDICT FUTURE INFLATIONARY IMPACTS OF ENERGY PRICE FLUCTUATIONS.

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