Macroeconomic Factors and the Stock Prices of US Hemp Firms

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INTRODUCTION

- Industrial hemp returned to growing fields after a 50-year hiatus through the 2014 Farm Bill and was legally allowed to be grown commercially in the US after the 2018 Farm Bill was passed.
- Due to the strong demand for hemp derived products, especially CBD oil, investors are optimistic about the potential in the hemp industry.
- Just like any other stock, investing in US hemp stocks is subject to some degree of influence from the macroeconomic factors present in the US economy.
- This study aims to analyze the descriptive and predictive relationships between US hemp stocks and selected macroeconomic variables.
- The results would prove valuable to potential investors, hemp firm managers and policymakers an extra tool in making investments in the hemp industry and understanding how the macroeconomy impacts the hemp industry.

RESEARCH QUESTIONS

(1) How do the selected macroeconomic factors affect US hemp stock prices in the short-run and long-run?
(2) Do the selected macroeconomic factors exhibit an asymmetric relationship with US hemp stock prices?

METHODS AND DATA

Three employed in this study to give an idea of how macroeconomic factors affect US hemp stocks in a descriptive and predictive sense. Equations a, b and c show the OLS, ARDL and NARDL models, respectively. Unlike the OLS and ARDL models, the NARDL model decomposes the dependent variables into positive and negative partials, to check for the presence asymmetric relationships in the model.

$$(a)\ Y_{it} = \alpha_{0i} + \beta_i X_t + \epsilon_{it}$$

$$(b)\ \Delta Y_{it} = \alpha_{0i} + \alpha_1 Y_{it-1} + \beta_i X_{-1} + \theta_i \sum_{j=0}^{p} \Delta Y_{it-1} + \gamma_i \sum_{j=0}^{q} X_{t-1} + \epsilon_{it}$$

$$(c)\ \Delta Y_{it} = \alpha_{0i} + \alpha_1 Y_{it-1} + \beta_i^+ X_{t-1}^+ + \beta_i^- X_{t-1}^- + \theta_i \sum_{i=1}^{p-1} \Delta Y_{it-1} + \gamma_1^+ \sum_{j=1}^{q-1} \Delta X_{t-1}^+ + \gamma_1^- \sum_{j=1}^{q-1} \Delta X_{t-1}^-$$

where Y_{it} represents US hemp Stock prices and X_t represents the four selected macroeconomic variables in the study

The monthly data on publicly-traded US hemp stock prices and the macroeconomic factors (10-year Interest Rates, Industrial Production, S&P 500 Index, and Global Oil Prices) was collected from Yahoo Finance and the Federal Reserve Bank of St. Louis over a four-year period (January 2019 to December 2022). The hemp firms included in this study are all US-based and are part of the hemp industry through their considerable involvement with hemp-derived products like CBD oil and hemp seeds.
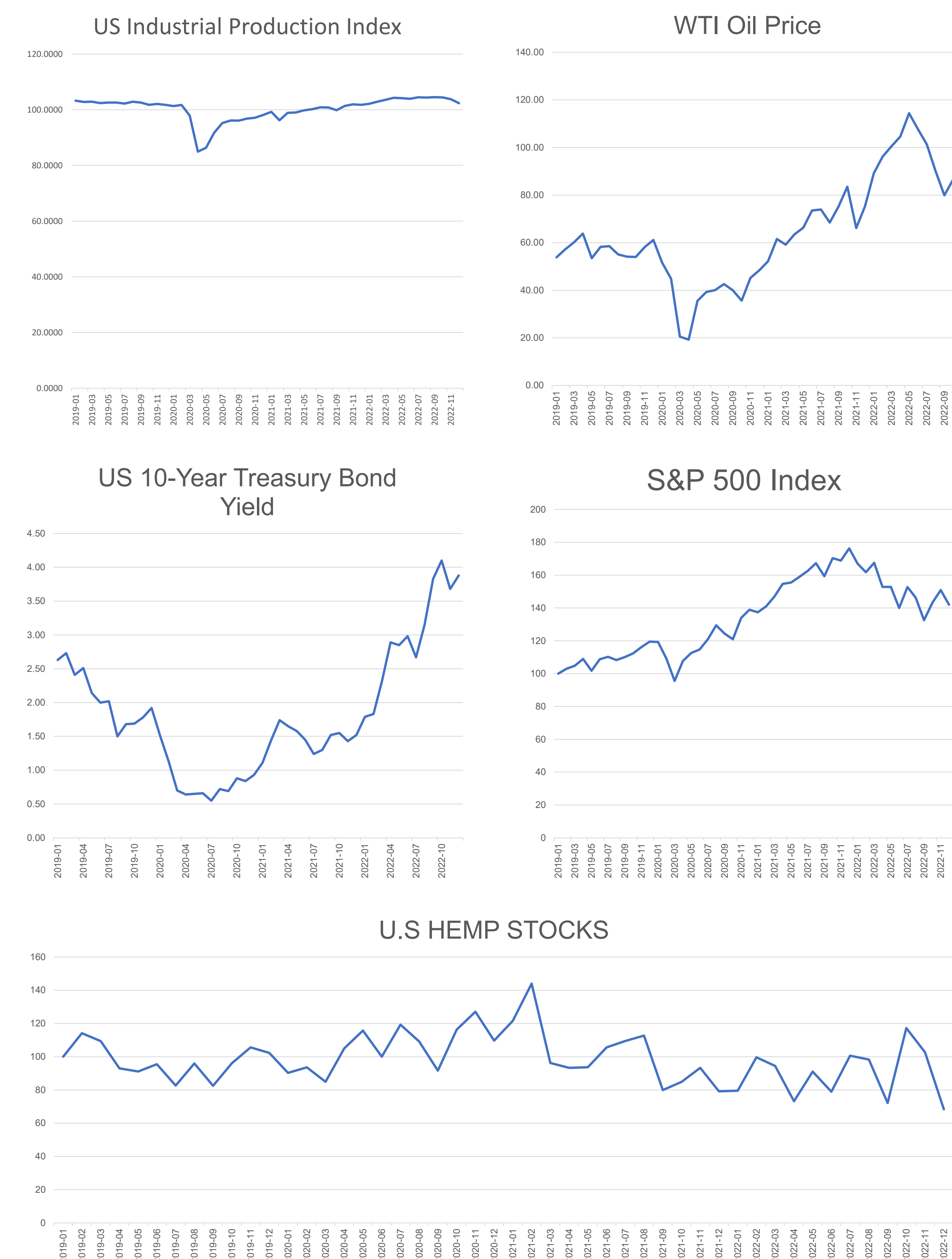
RESULTS

Table 1: OLS Model Estimation Results

Variable	Coefficient	p-value
Industrial Production Index	5.001***	0.000
10-year Treasury Bond Yield	-0.974**	0.000
S&P 500 Index	-1.232**	0.000
West Texas Intermediate Price	0.557**	0.002
Diagnostics		
R-Squared	0.015	
F-Value	171.56	0.0000

Table 2: ARDL Model Estimation Results

Variable	Short Run	p-value	Long Run	p-value
Industrial Production Index	0.4915	0.3931	12.8242**	0.0061
10-year Treasury Bond Yield	0.1560	0.0574	-2.6327**	0.0000
S&P 500 Index	1.4939**	0.0000	-2.6880**	0.0023
West Texas Intermediate Price	0.1843**	0.0004	0.4834	0.4156
Diagnostics				
Log Likelihood	249.471			
Error Correction	-0.0741**	0.0000		

Trend of US Hemp Stock Prices and the Selected Macroeconomic Variables Over the Study Period

US Industrial Production Index

WTI Oil Price

US 10-Year Treasury Bond Yield

S&P 500 Index

U.S HEMP STOCKS

RESULTS

Table 3: Short-Run NARDL Model Estimation Results

Variable	Short-Run Effect		
	Positive	Negative	Wald Test
Industrial Production Index	2.2654**	2.0988	6.78**
10-year Treasury Bond Yield	-0.3145**	-0.1734*	23.89**
S&P 500 Index	1.4803**	2.1322**	6.45**
West Texas Intermediate Price	0.5992**	0.0125	31.68**
Diagnostics			
Log Likelihood	411.1305		
Error Correction	-1.012**		

Table 4: Long-Run NARDL Model Estimation Results

Variable	Long-Run Effect		
	Positive	Negative	Wald Test
Industrial Production Index	1.6359*	-0.3834	3.65
10-year Treasury Bond Yield	-0.9994**	-0.4516**	52.04**
S&P 500 Index	-3.3497**	-2.1267**	4.35**
West Texas Intermediate Price	-0.6430**	-0.0521	12.04**
Diagnostics			
Log Likelihood	411.1305		
Error Correction	-1.012**		

MAIN FINDINGS

- OLS results show that all four selected macroeconomic variables significant impact US hemp stock prices.
- Specifically, Industrial Production Index and Global Oil Prices Positively affect US hemp stock prices while Interest rates and the S&P 500 negatively impact US hemp stock prices.
- The NARDL results suggests asymmetrical relationships between US hemp stock prices and the selected macroeconomic indicators in both the short run and long run.
- The US Industrial Production Index and the S&P 500 Index show the largest short-run and long-run effects on US hemp stock prices, respectively.
- Positive fluctuations in the macroeconomic variables show a greater impact on US hemp stock prices, when compared to the negative fluctuations.

CONCLUSIONS

- Investors have an idea of the short- and long-term advantages or disadvantages of investing in the hemp industry compared to overall stock markets like the S&P 500.
- Understanding how positive and negative fluctuations in the macroeconomy affects the US hemp industry could be a useful tool to potential investors as they choose to add hemp stocks to their portfolios.
- Hemp firm managers can use the results of this study as a tool to manage their firms and make decisions based on prevailing macroeconomic and overall stock market conditions.