# Examining the nexus between cotton and kapas of MCX market on stock prices of textile industry in India using ARDL model

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**ABSTRACT – REZUMAT**

**Examining the nexus between cotton and kapas of MCX market on stock prices of textile industry in India using ARDL model**

*This research study makes efforts to find the correlation between the prices of commodities in MCX and the prices of stocks by considering the textile companies and allied commodities in the commodities market. The study examined whether the price of cotton and kapas in the commodities market i.e., Multi Commodity Exchange (MCX), might have an effect on the stock prices of textile companies in India using the ARDL Model. The secondary data related to cotton and kapas prices are downloaded from the MCX website. Similarly, the data related to the closing prices of stocks of India's top five textile companies based on market capitalization, are downloaded from the website of Kotak Securities. All the ARDL models for the short run are considered as too weak as the coefficient of determination and adjusted R-squared are too low.*

***Keywords:*** *Autoregressive Distributed Lags (ARDL), MCX, textile industry, cotton, kapas*

**Examinarea legăturii dintre bumbac și kapas pe piața MCX în ceea ce privește prețurile acţiunilor din industria textilă din India folosind modelul ARDL**

*Acest studiu de cercetare face eforturi pentru a găsi corelația dintre prețurile mărfurilor pe piața Multi Commodity Exchange (MCX) și prețurile acțiunilor, luând în considerare companiile textile și mărfurile conexe pe piața mărfurilor. Studiul a examinat dacă prețul bumbacului și kapas-ului pe piața mărfurilor, adică Multi Commodity Exchange (MCX), ar putea avea un efect asupra prețurilor acțiunilor companiilor textile din India care utilizează modelul ARDL. Datele secundare legate de prețurile bumbacului și kapas-ului sunt descărcate de pe site-ul MCX. În mod similar, datele referitoare la prețurile de închidere ale acțiunilor din primele cinci companii textile din India pe baza capitalizării bursiere sunt descărcate de pe site-ul web al Kotak Securities. Toate modelele ARDL pe termen scurt sunt considerate prea slabe, deoarece coeficientul de determinare și R-pătrat ajustat sunt prea reduse.*

***Cuvinte-cheie****: Model Autoregresiv cu Lag-uri Distribuite (ARDL), MCX, industria textilă, bumbac, kapas*

## INTRODUCTION

The textile industry is extremely important to the overall structure of the Indian economy. Known for its centuries-old tradition of textile production [1, 2], India has established itself as a global powerhouse in the field. The industry encompasses a diverse range of activities [3], from the cultivation of raw materials like cotton, silk, and jute to the manufacturing of various textiles and garments [4]. It is a major source of employment, providing livelihoods to millions of workers, particularly in rural areas. Textile exports are a substantial source of revenue for the economy due to their high value on the global market [5]. The industry's strength lies in its ability to offer a wide array of fabrics, including traditional handloom and handcrafted textiles, as well as modern and technologically advanced products. Furthermore, efforts are being made to promote sustainable and eco-friendly practices in the sector, ensuring its long-term viability and global competitiveness [6–8].

The textile industry of India is mainly dependent on primary raw materials i.e., Cotton and kapas (raw cotton) [4]. As one of the largest producers of cotton globally [9, 10], India's favourable climatic conditions and vast agricultural lands make it an ideal hub for cotton cultivation [11]. The country boasts a rich variety of cotton, with different regions specializing in different types. The cultivation of kapas provides a steady supply of raw cotton for the industry [12], which is then processed into various textiles and garments. The availability of these raw materials has enabled India to establish a robust textile sector [13, 14], fuelling its growth and contributing significantly to both domestic consumption and international exports. Now it will be interesting to examine whether

the prices of cotton and kapas in the commodities market affect the stock prices of textile companies [15, 16] in India. Moreover, examining such kinds of effects would also highlight the presence of a correlation between stock and commodity markets in India [17–19].

The correlation between the stock and commodity is complex and interconnected [20]. Commodities such as oil, gold, agricultural products, and metals are traded in the commodities market, while stocks represent ownership in companies and are traded in the stock market [21]. These markets are influenced by several factors, incorporating geopolitical happenings, supply and demand dynamics, global economic situations, and investor sentiment [22]. Variations in commodity values can have a profound influence on the stock market, particularly for companies involved in commodity production, transportation, or consumption. Moreover, fluctuations in stock prices can also influence commodity prices, as investor perceptions of future economic growth or recession impact demand for commodities [23]. Overall, the commodities market and stock market are closely linked [24], reflecting the intricate relationship between global trade, economic activity, and investor behaviour.

Similarly, while considering the textile industry in India, the price of cotton and kapas in the commodities market, particularly on the Multi Commodity Exchange (MCX), has a direct influence on the stock values of textile firms in India [25,26]. Cotton and kapas are the main raw materials for the textile industry, and any fluctuations in their prices can significantly influence the profitability and financial performance of textile companies. When the prices of cotton and kapas rise in the commodities market, it leads to increased input costs for textile manufacturers. This, in turn, can result in lower profit margins and reduced earnings for the companies. As a result, investors react to such developments by selling off their shares, leading to a decline in the stock values of textile firms. Conversely, if the prices of cotton and kapas fall, it benefits the textile companies as their input costs decrease. This can lead to improved profit margins and increased earnings, subsequently driving up the stock prices. Therefore, the commodities market, especially the price movements of cotton and kapas, directly influences the investment sentiment and stock performance of textile companies in India. It is also noted that the current price of both the commodities i.e., cotton and kapas might not affect the current stock price of textiles companies in India, rather it may affect the future stock price of textiles companies. In other words, the current stock price of textile companies might be affected by lagged values or prices of the commodities. Hence, the Autoregressive Distributed Lags (ARDL) model will be most suitable in examining the nexus between cotton and kapas of MCX and stock prices of textile companies of India as the ARDL model considers the lag values to capture the dynamic correlation among variables over time [27].

## REVIEW OF LITERATURE

There are good numbers of literature in which discussions on the linkage between multi-commodity exchanges on stock prices have appeared [28]. Cointegration can be determined by examining the longstanding connection between the variables and the temporary stimuli using the ARDL bounds. Cointegration is observed between corn and soybean futures contracts, long-term influences on corn prices in Brazil come from exchange rates and corn traded in the United States, while oil prices have a shorter-term impact [29]. Level and non-level time series were used to conduct both the ADF test [30] and Zivot-Andrews tests [31], covering the years leading up to the 2005 liberalisation of the financial markets. Once the financial market of China opened up, the RMB's exchange rate versus the US dollar and the Hong Kong dollar began to move in tandem with the price of Chinese stocks [32]. Employing ARDL bounds testing examines linkages among the growth of the stock market, inflation, money availability and economic growth. Time series data of the Indian economy (1994–2012) were used for this purpose. Market capitalization and turnover ratio, stock market expansion and growth, price rise and turnover ratio, price rise and money supply, and market capitalization and inflation were all determined to be one-way relationships [33].

The ARDL limits test confirms the long-term cointegration of macroeconomic indicators in India. According to long-term ARDL estimations, sector-specific GDP and stock market indices are positively and strongly connected [34]. ARDL bounds testing calculations for the current and expected price of oil utilising data from 1$^{st}$ January 2007 to 30$^{th}$ April 2015 confirmed longstanding equilibrium links between the two [35]. Cointegration evidence from ARDL bound testing Bangladesh's economy grew steadily over time, with a GDP expansion of roughly 6.5%, thanks in large part to government measures for prospective stock issuance that increased the country's access to long-term finance [36]. An ARDL was used to explore the correlation of the US stock market, the worldwide commodity market and developing Islamic stock markets. The sample data comprises stock prices from 1995 to 2019, as well as commodity prices. The US stock market has no long-term relationship with Islamic Developing stock markets or global commodity markets [37].

Trading probability and stock market index are all intertwined over time, according to Bhattacharya et al. [38] analysis of the correlation among stock market activities and its endogenous liquidity factors using the ARDL Bounds Testing Approach. The long-run coefficients suggest that the explanatory factors have a long-term effect on the stock market. Market capitalization has a progressive and considerable influence on economic development over the medium and long term, estimations of ARDL.

Nepal experiences long-term economic development, stock market expansion, and regulating variables all have a solid relationship with one another [39]. The stock market, real estate sector of Vietnam and economic expansion may all be studied together using the ARDL. In Vietnam, the expansion of the real estate sector, the economy and the stock market all work together [40]. Khan et al. [41] time series data for the period of 1st January 2000 to 31st December 2018 to analyse the asymmetric influence of oil prices on stock yields on the Shanghai Stock Exchange. The estimated value of the Akaike Information Criterion is the smallest associated with other lag selection criteria; hence it is utilised for lag selection. When oil prices rise, it lowers stock yields, as shown by the asymmetric long- and short-term results we looked at, while when oil prices fall, they have an affirmative effect on stock yields [42].

Mroua and Trabelsi [43] examine the correlation between exchange rate fluctuations and BRICS stock market index volatility from 1 January 2008 to February 2018. The PMG/ARDL model found that stock market indexes' previous performances only significantly affect their present returns over the long run. All BRICS countries' short-term and long-term market index yields are heavily affected by exchange rate movements. Manogna and Mishra [44] use daily data to test the association, the ARDL bound test shows no long-term relation between the BSE FMCG index and agricultural commodities. Indian agricultural commodities markets lack data to predict stock prices. There appear to be better long-term investing prospects in the Islamic stock markets of Gulf Cooperation Council countries because they are less efficient in the short term [45, 46].

The World Bank's logistic performance index (LPI) is based on the weighted averages of six important factors, including the speed of the customs clearance process, the infrastructure's suitability for trade and transportation, the ease of shipping goods at competitive prices etc. The results show the significance of foreign direct investments and their positive correlation with the LPI over the medium and long term, which is a good sign for an economy's expansion [47]. Alshubiri [48] analyses the impact of volatile commodity prices, uncertain economic policy, and sustainable stock market sustainability on alternative investments such as gold, oil, and bitcoin, discovering favourable long-term effects on stable returns.

Garg et al. [49] examined the effects of macroeconomic factors on the commodity indices iCOMDEX composite, bullion, metal, and energy traded on MCX between January 2016 and March 2020 using the ARDL model. According to the short-run model, the wholesale price index and the index of industrial production have a positive and large impact on the iCOMDEX composite, while no macroeconomic variable has a significant short-term impact on bullion. Kumar et al. [50], Kumar et al. [51] and Meher et al. [52] examined the stock market's relationship with international gold costs, crude oil costs, and India's exchange rate. The nonlinear autoregressive distributed lag model shows that the exchange rate has a negative relationship with international gold prices in the short and long run, crude oil positively affects the stock market, and international gold prices positively affect crude oil.

### Research gap

Despite the extensive research on commodity markets and stock prices, there remains a notable research gap in exploring the specific nexus between cotton and kapas (raw cotton) prices on the stock prices of textile industries in India. While many studies have examined the influence of commodity prices on stock markets, few have concentrated on the dynamic correlation between cotton and kapas prices and their effects on the Indian textile sector using the ARDL model. Investigating this relationship can provide valuable intuitions for stakeholders, investors and policymakers in the textile industry to make informed decisions and develop effective risk management strategies.

### Objectives of the study

- To explore the effects of prices of cotton and kapas in the commodities market, on stock prices of textile companies in India.
- To develop a model to predict or derive stock prices of textile companies in India with the prices of cotton and kapas in MCX using the ARDL model.

## RESEARCH METHODOLOGY

The analysis is analytical. The analysis is based on secondary data. For examining the nexus between Cotton and Kapas of MCX on Stock Prices of Textile Industries in India, the Autoregressive Distributed Lags model (ARDL) has been used. The secondary data related to the prices of cotton and kapas are downloaded from the MCX website. Similarly, the data related to the closing prices of stocks of India's top five textile companies based on market capitalization, are downloaded from the website of Kotak Securities. The top five companies are Page Industries with 466.23 billion Market Capitalization, KPR Mill with 198.01 billion Market Capitalization, Trident Group India – 172.66 billion Market Capitalization, Welspun India – 91.02 billion and Alok Industries – 64.3 billion. The data ranges from 1st April 2021 to 31st March 2023. For making all the data stationary, log returns have been calculated and the stationarities of all the data are examined using the Augmented Dickey-Fuller test. For examining the different formulated ARDL models which show the impact of the prices of cotton and kapas in MCX on the Stock Prices of Textile Industries in India, the values of (Akaike Information Criterion) AIC, Bayesian Information Criterion (BIC) and adjusted *R* squared of different models are compared.

Analysis of residuals will be done by checking autocorrelation, hetero-scedasticity, and normality of residuals using diagnostic tests like the Ljung-Box

test, Breusch-Pagan test, and Shapiro-Wilk test, respectively. For stationarity check, formulation of ARDL Models, hypotheses testing and analysis of the residuals, EVIEWS 10 will be used.

### Need of the study with managerial implications

The textile industry in India is crucial for the economy, employing millions. Understanding the relationship between cotton and kapas prices and stock prices can provide valuable insights for policymakers, industry professionals, and investors. This knowledge can guide investment decisions, portfolio diversification, and risk management strategies, ultimately improving productivity and job creation.

### Limitations of the study

The study examines cotton and kapas prices in India's textile industry, ignoring related commodities and stocks and utilising the ARDL model for short-run framing.

## ANALYSIS, RESULTS AND DISCUSSION

Considering the textile industry in India, the price of cotton and kapas in the commodities market, particularly on the Multi Commodity Exchange (MCX), might influence the stock prices of textile companies in India. But the current price of cotton and kapas in the commodities market might not be reflected in the current stock prices of textile companies, rather it may be reflected in future stock prices. In other words, the current stock prices of textile companies might be affected by the lagged values or prices of kapas and cotton. For examining such kind of relationship, the Autoregressive Distributed Lag (ARDL) model has been implemented.

The generalized Autoregressive Distributed Lag (p, q) model is stated as follows:

$$Y_t = \gamma_{0i} + \sum_{i=1}^{p} \delta_i Y_{t-i} + + \sum_{i=0}^{q} \beta'_i Y_{t-i} + \varepsilon_{it} \quad (1)$$

where $Y_t$ is a vector and the variables in ($Xt$) are allowed to be purely.

To make the data related to the prices of cotton, kapas and other top 5 selected textile companies of India stationary, log returns have been computed which are graphically represented in figure 1.

After converting data in the log returns of daily closing prices of selected companies, cotton and kapas depict that the data

### Examining the impact of prices of kapas and cotton on the stock prices of Page Industries

Page Industries Limited is a company based in Bangalore, India, that produces and sells underwear, lingerie, and socks. It holds the Jockey International license exclusively. It began selling Speedo swimwear in India and Sri Lanka under a license from Pentland Group in 2011.

Table 1 represents the outcomes of the ARDL model which is automatically selected from the models with 12 different lags, by EVIEWS 10 software based on AIC. The automatically selected model shows nine explanatory lagged variables and a constant. Among these explanatory variables, only the 5$^{th}$ lag value of

Table 1

OUTCOMES OF ARDL MODEL FOR PAGE INDUSTRIES WITH 12 LAGS DYNAMIC REGRESSORS OF COTTON AND KAPAS PRICE

| | | | | |
|---|---|---|---|---|
| Dependent Variable: NLPAGE | | | | |
| Method: ARDL | | | | |
| Date: 07/10/23 Time: 16:06 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| Maximum dependent lags: 12 (Automatic selection) | | | | |
| Model selection method: Akaike info criterion (AIC) | | | | |
| Dynamic regressors (12 lags, automatic): NLCOTTON NLKAPAS | | | | |
| Fixed regressors: C | | | | |
| Number of models evaluated: 2028 | | | | |
| Selected Model: ARDL(1, 0, 6) | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLPAGE(–1) | –0.004467 | 0.044035 | –0.101450 | 0.9192 |
| NLCOTTON | –0.020276 | 0.031436 | –0.645002 | 0.5192 |
| NLKAPAS | –0.013414 | 0.040284 | –0.332982 | 0.7393 |
| NLKAPAS(–1) | 0.034275 | 0.040271 | 0.851107 | 0.3951 |
| NLKAPAS(–2) | –0.015748 | 0.040270 | –0.391064 | 0.6959 |
| NLKAPAS(–3) | –0.006819 | 0.040277 | –0.169293 | 0.8656 |
| NLKAPAS(–4) | 0.028060 | 0.040245 | 0.697233 | 0.4860 |
| NLKAPAS(–5) | 0.135301 | 0.040275 | 3.359414 | 0.0008 |
| NLKAPAS(–6) | 0.075215 | 0.040687 | 1.848615 | 0.0651 |
| C | 0.000364 | 0.000732 | 0.497509 | 0.6190 |
| R-squared | 0.032050 | Mean dependent var | | 0.000428 |
| Adjusted R-squared | 0.015036 | S.D. dependent var | | 0.016736 |
| S.E. of regression | 0.016610 | Akaike info criterion | | –5.338692 |
| Sum squared resid | 0.141251 | Schwarz criterion | | –5.257128 |
| Log-likelihood | 1403.399 | Hannan-Quinn criteria. | | –5.306746 |
| F-statistic | 1.883686 | Durbin-Watson stat | | 2.001454 |
| Prob(F-statistic) | 0.052074 | | | |

Note: * p-values and any subsequent tests do not account for model selection.
Source: Computation Using EVIEWS 10.

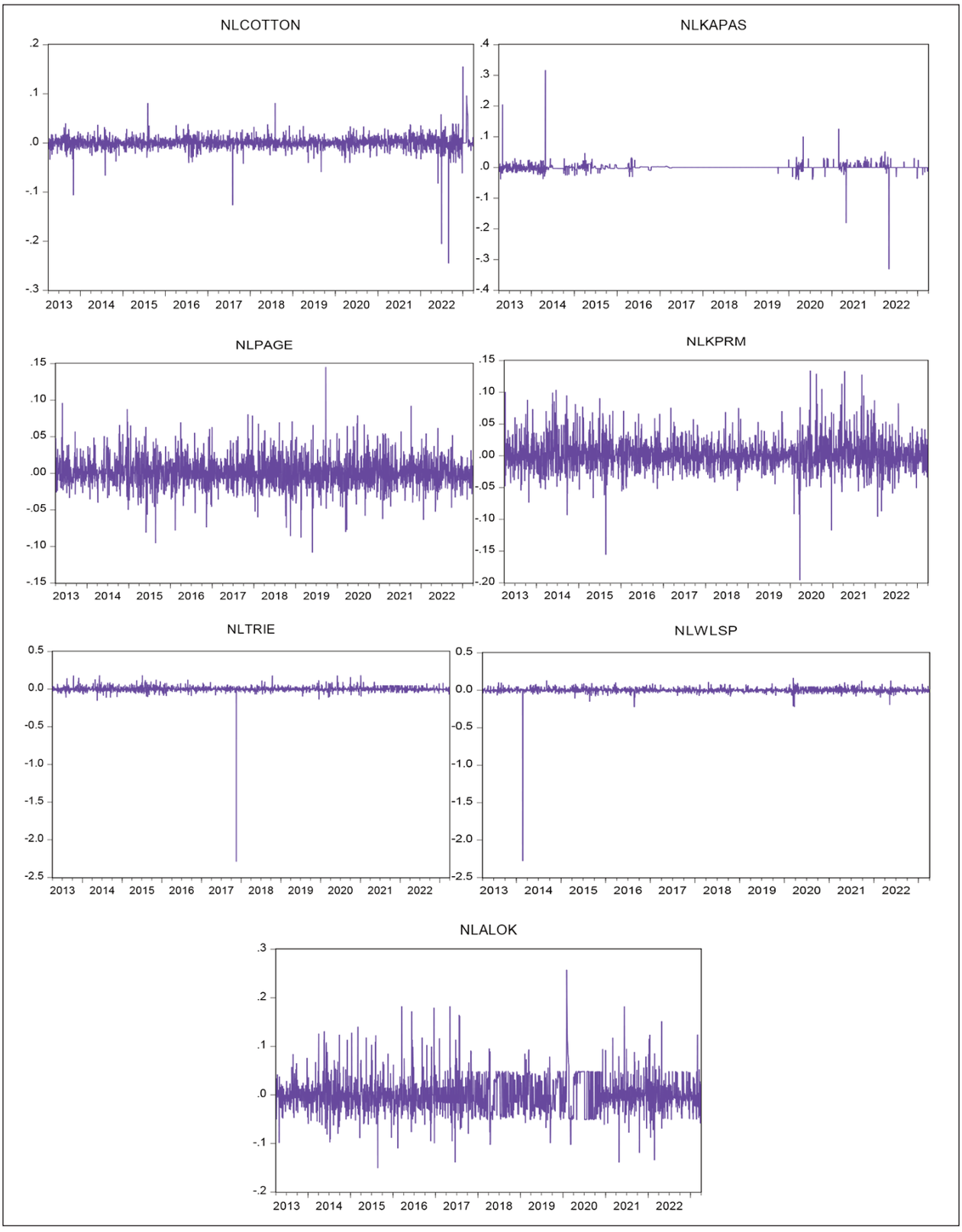


Fig. 1. Graphs of Log Returns of prices of cotton, kapas and other top 5 selected textile companies based on market capitalization

kapas seems significant as its *p* value is less than 0.05. Moreover, the *R*-squared, i.e. coefficient of determination, is 0.032 which depicts that the explanatory variables can explain 3.5% of the variation of dependent variables i.e. stock prices of Page Industries. The model is reframed by eliminating the non-significant explanatory lags. The outcomes of the reformulated model are mentioned in table 2.

Table 2 illustrates the selected model which includes the 5$^{th}$ and 6$^{th}$ lag of Kapas price. In other words, the current stock price of Page Industries is affected by the 5$^{th}$ and 6$^{th}$ lag price of Kapas. Although the coef-

ficient of these lags is significant as the p values are less than 0.05, the *R* squared is 0.028068 which implies that the explanatory variables namely the 5th and 6th lag price of kapas can explain only hardly 3% of the variation of dependent variables i.e., stock prices of Page Industries.

**Examining the impact of prices of kapas and cotton on the stock prices of KPR Mill**

KPR Mill is a publicly traded, vertically integrated company that specializes in a wide range of products, including yarn, fabrics, garments, and even white crystal sugar. KPR has 40 years of experience in the textile industry, which has allowed them to leave an indelible mark on the industry. KPR Mill produces an extensive line of textile goods, including ready-to-wear garments, fabrics, and compact, melange, carded, polyester, and combed yarn, which it sells to customers all over the world.

Table 3 represents the outcomes of the ARDL model which is automatically selected from the models with 12 different lags, by EVIEWS 10 software based on AIC. The automatically selected model shows three explanatory lagged variables and a constant. Among these explanatory variables, only the present value of cotton seems significant as its *p* value is less than 0.05.

Moreover, the *R*-squared, i.e., coefficient of determination, is 0.0107 which depicts that the explanatory variables can explain only 1.1% of the variation of dependent variables i.e., stock prices of KPR Mill. The model is reframed by eliminating the non-significant explanatory lags. The outcomes of the reformulated model are mentioned in table 4. Table 4 shows the selected model which includes only the current price of cotton. In other words, the current stock price of KPR Mill is affected by the current price of cotton. Although the coefficient of these lags is significant as the *p* values are less than 0.05, the *R* squared is 0.00355 which implies that the

Table 2

| OUTCOMES OF ARDL MODEL FOR PAGE INDUSTRIES WITH SIGNIFICANT LAGS OF COTTON AND KAPAS PRICE | | | | |
|---|---|---|---|---|
| Dependent Variable: NLPAGE | | | | |
| Method: Least Squares | | | | |
| Date: 07/11/23 Time: 16:59 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLKAPAS(–6) | 0.073396 | 0.039957 | 2.076885 | 0.0468 |
| NLKAPAS(–5) | 0.137804 | 0.039960 | 3.448599 | 0.0006 |
| R-squared | 0.028068 | Mean dependent var | | 0.000428 |
| Adjusted R-squared | 0.026199 | S.D. dependent var | | 0.016736 |
| S.E. of regression | 0.016515 | Akaike info criterion | | –5.365238 |
| Sum squared resid | 0.141832 | Schwarz criterion | | –5.348925 |
| Log-likelihood | 1402.327 | Hannan-Quinn criteria. | | –5.358848 |
| Durbin-Watson stat | 2.014877 | | | |

Note: * p-values and any subsequent tests do not account for model selection.
Source: Computation Using EVIEWS 10.

Table 3

| OUTCOMES OF ARDL MODEL FOR KPR MILL WITH 12 LAGS DYNAMIC REGRESSORS OF COTTON AND KAPAS PRICE | | | | |
|---|---|---|---|---|
| Dependent Variable: NLKPRM | | | | |
| Method: ARDL | | | | |
| Date: 07/10/23 Time: 16:18 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| Maximum dependent lags: 12 (Automatic selection) | | | | |
| Model selection method: Akaike info criterion (AIC) | | | | |
| Dynamic regressors (12 lags, automatic): NLCOTTON NLKAPAS | | | | |
| Fixed regressors: C | | | | |
| Number of models evaluated: 2028 | | | | |
| Selected Model: ARDL(1, 0, 0) | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLKPRM(–1) | 0.036195 | 0.043832 | 0.825767 | 0.4093 |
| NLCOTTON | 0.096130 | 0.046708 | 2.058128 | 0.0401 |
| NLKAPAS | –0.050916 | 0.060038 | –0.848071 | 0.3968 |
| C | 0.001667 | 0.001090 | 1.529615 | 0.1267 |
| R-squared | 0.010791 | Mean dependent var | | 0.001910 |
| Adjusted R-squared | 0.005062 | S.D. dependent var | | 0.024793 |
| S.E. of regression | 0.024731 | Akaike info criterion | | –4.553922 |
| Sum squared resid | 0.316809 | Schwarz criterion | | –4.521297 |
| Log-likelihood | 1192.574 | Hannan-Quinn criteria. | | –4.541144 |
| F-statistic | 1.883643 | Durbin-Watson stat | | 2.001095 |
| Prob(F-statistic) | 0.131308 | | | |

Note: * p-values and any subsequent tests do not account for model selection.
Source: Computation Using EVIEWS 10.

Table 4

| OUTCOMES OF ARDL MODEL FOR PAGE INDUSTRIES WITH SIGNIFICANT LAGS OF COTTON AND KAPAS PRICE AS REGRESSOR | | | | |
|---|---|---|---|---|
| Dependent Variable: NLKPRM | | | | |
| Method: Least Squares | | | | |
| Date: 07/12/23 Time: 16:41 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLCOTTON | 0.103701 | 0.046533 | 2.228545 | 0.0263 |
| R-squared | 0.003552 | Mean dependent var | | 0.001910 |
| Adjusted R-squared | 0.003552 | S.D. dependent var | | 0.024793 |
| S.E. of regression | 0.024749 | Akaike info criterion | | –4.558125 |
| Sum squared resid | 0.319127 | Schwarz criterion | | –4.549968 |
| Log-likelihood | 1190.671 | Hannan-Quinn criteria. | | –4.554930 |
| Durbin-Watson stat | 1.928252 | | | |

Table 5

| OUTCOMES OF ARDL MODEL FOR TRIDENT GROUP WITH 12 LAGS DYNAMIC REGRESSORS OF COTTON AND KAPAS PRICE | | | | |
|---|---|---|---|---|
| Dependent Variable: NLTRIE | | | | |
| Method: ARDL | | | | |
| Date: 07/10/23 Time: 16:36 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| Maximum dependent lags: 12 (Automatic selection) | | | | |
| Model selection method: Akaike info criterion (AIC) | | | | |
| Dynamic regressors (12 lags, automatic): NLCOTTON NLKAPAS | | | | |
| Fixed regressors: C | | | | |
| Number of models evaluated: 2028 | | | | |
| Selected Model: ARDL(3, 2, 11) | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLTRIE(–1) | 0.219605 | 0.044075 | 4.982520 | 0.0000 |
| NLTRIE(–2) | –0.076934 | 0.044955 | –1.711341 | 0.0876 |
| NLTRIE(–3) | 0.064305 | 0.044129 | 1.457196 | 0.1457 |
| NLCOTTON | 0.025566 | 0.050704 | 0.504217 | 0.6143 |
| NLCOTTON(–1) | 0.052722 | 0.051528 | 1.023177 | 0.3067 |
| NLCOTTON(–2) | –0.118903 | 0.050640 | –2.348021 | 0.0193 |
| NLKAPAS | 0.027925 | 0.063372 | 0.440654 | 0.6597 |
| NLKAPAS(–1) | 0.084957 | 0.063358 | 1.340902 | 0.1806 |
| NLKAPAS(–2) | 0.021714 | 0.063444 | 0.342251 | 0.7323 |
| NLKAPAS(–3) | –0.040279 | 0.063460 | –0.634716 | 0.5259 |
| NLKAPAS(–4) | –0.082341 | 0.063486 | –1.296999 | 0.1952 |
| NLKAPAS(–5) | –0.013333 | 0.063372 | –0.210395 | 0.8334 |
| NLKAPAS(–6) | –0.130696 | 0.063304 | –2.064565 | 0.0395 |
| NLKAPAS(–7) | 0.203872 | 0.063612 | 3.204908 | 0.0014 |
| NLKAPAS(–8) | 0.090900 | 0.064075 | 1.418657 | 0.1566 |
| NLKAPAS(–9) | 0.005558 | 0.064183 | 0.086604 | 0.9310 |
| NLKAPAS(–10) | 0.013412 | 0.063870 | 0.209981 | 0.8338 |
| NLKAPAS(–11) | –0.166695 | 0.063577 | –2.621913 | 0.0090 |
| C | 0.001138 | 0.001157 | 0.983776 | 0.3257 |
| R-squared | 0.105075 | Mean dependent var | | 0.001318 |
| Adjusted R-squared | 0.073050 | S.D. dependent var | | 0.027062 |
| S.E. of regression | 0.026055 | Akaike info criterion | | –4.421522 |
| Sum squared resid | 0.341459 | Schwarz criterion | | –4.266549 |
| Log-likelihood | 1173.017 | Hannan-Quinn criteria. | | –4.360823 |
| F-statistic | 3.281015 | Durbin-Watson stat | | 1.989124 |
| Prob(F-statistic) | 0.000007 | | | |

Note: * p-values and any subsequent tests do not account for model selection.
Source: Computation Using EVIEWS 10.

explanatory variable i.e., the current price of cotton can explain only hardly 0.4% of the variation of dependent variables i.e., stock prices of KPR Mill.

### Examining the impact of prices of kapas and cotton on the stock prices of Trident Group India

The Trident Group of Companies manufactures home textile products, paper products, chemicals, and yarn solutions, and is one of India's leading global textile fabric conglomerates. There is no competition for Trident Group on a global scale. Trident, based in the Indian city of Ludhiana, Punjab, produces more terry towels and paper made from wheat straw than any other company in the world.

Table 5 represents the outcomes of the ARDL model which is automatically selected from the models with 12 different lags, by EVIEWS 10 software based on AIC. The automatically selected model shows three explanatory lagged variables and a constant. Among these explanatory variables, only the present value of cotton seems significant as its *p* value is less than 0.05. Moreover, the *R*-squared, i.e. coefficient of determination, is 0.1050 which depicts that the explanatory variables can explain 10.5% of the variation of dependent variables i.e. stock prices of Trident Group India. The model is reframed by eliminating the non-significant explanatory lags. The outcomes of the reformulated model are mentioned in table 6.

Table 6 shows the selected model which includes the 2$^{nd}$ lag of cotton price and the 6$^{th}$, 7$^{th}$ and 11$^{th}$ lag of kapas price. In other words, the current stock price of Trident Group India is affected by the 2$^{nd}$ lag of cotton price and the 6$^{th}$, 7$^{th}$ and 11$^{th}$ lag of kapas price.

Although the coefficient of these lags is significant as the *p* values are less than 0.05, the *R* squared is 0.034056 which implies that the explanatory variables namely the 2nd lag of cotton price and 6th, 7th and 11th lag of kapas price can explain only 3.5% of the variation of dependent variables i.e., stock prices of Trident Group India.

### Examining the impact of prices of kapas and cotton on the stock prices of Welspun India

One of India's most dynamic and rapidly expanding multinational corporations, Welspun Group operates in the line pipe, home textile product, infrastructure, warehousing, steel, oil and gas, advanced textile, and flooring solution industries.

Table 7 represents the results of the ARDL model which is automatically selected from the models with 12 different lags, by EVIEWS 10 software based on AIC. The automatically selected model shows three explanatory lagged variables and a constant. Among these explanatory variables, only the present value of cotton seems significant as its *p* value is less than 0.05. Moreover, the *R*-squared, i.e. coefficient of determination, is 0.120415 which depicts that the explanatory variables can explain only 12.05% of the variation of dependent variables i.e. stock prices of Welspun India Ltd. The model is reframed by eliminating the non-significant explanatory lags. The outcomes of the reformulated model are mentioned in table 8.

Table 8 shows the selected model which includes the 2nd lag of the stock price of Welspun India Ltd., the 7th, 8th and 11th lag of the kapas price. In other words, the current stock price of Welspun India Ltd is affected by the 2nd lag of the stock price of Welspun

Table 6

OUTCOMES OF ARDL MODEL FOR TRIDENT GROUP INDIA WITH SIGNIFICANT LAGS OF COTTON AND KAPAS PRICE AS REGRESSOR

Dependent Variable: NLTRIE
Method: Least Squares
Date: 07/14/23 Time: 16:48
Sample: 4/01/2021 3/31/2023
Included observations: 522

| Variable | Coefficient | Standard Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| NLCOTTON(–2) | –0.083819 | 0.050137 | –2.011792 | 0.0452 |
| NLKAPAS(–6) | –0.130904 | 0.064561 | –2.027611 | 0.0431 |
| NLKAPAS(–7) | 0.174189 | 0.064580 | 2.697263 | 0.0072 |
| NLKAPAS(–11) | –0.153567 | 0.064546 | –2.379168 | 0.0177 |
| R-squared | 0.034056 | Mean dependent var | | 0.001318 |
| Adjusted R-squared | 0.028462 | S.D. dependent var | | 0.027062 |
| S.E. of regression | 0.026674 | Akaike info criterion | | –4.402627 |
| Sum squared resid | 0.368556 | Schwarz criterion | | –4.370001 |
| Log-likelihood | 1153.086 | Hannan-Quinn criteria. | | –4.389848 |
| Durbin-Watson stat | 1.569976 | | | |

Table 7

OUTCOMES OF ARDL MODEL FOR KPR MILL WITH 12 LAGS DYNAMIC REGRESSORS OF COTTON AND KAPAS PRICE

Dependent Variable: NLWLSP
Method: ARDL
Date: 07/10/23 Time: 16:38
Sample: 4/01/2021 3/31/2023
Included observations: 522
Maximum dependent lags: 12 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (12 lags, automatic): NLCOTTON NLKAPAS
Fixed regressors: C
Number of models evaluated: 2028
Selected Model: ARDL(2, 0, 11)

| Variable | Coefficient | Standard Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| NLWLSP(–1) | 0.037446 | 0.044158 | 0.848017 | 0.3968 |
| NLWLSP(–2) | –0.099855 | 0.044087 | –2.264969 | 0.0239 |
| NLCOTTON | 0.037135 | 0.050533 | 0.734869 | 0.4628 |
| NLKAPAS | –0.073172 | 0.064908 | –1.127321 | 0.2601 |
| NLKAPAS(–1) | –0.023727 | 0.064924 | –0.365449 | 0.7149 |
| NLKAPAS(–2) | –0.010497 | 0.064699 | –0.162242 | 0.8712 |
| NLKAPAS(–3) | 0.012731 | 0.064682 | 0.196821 | 0.8440 |
| NLKAPAS(–4) | –0.080903 | 0.064601 | –1.252358 | 0.2110 |
| NLKAPAS(–5) | 0.005476 | 0.064588 | 0.084780 | 0.9325 |
| NLKAPAS(–6) | 0.026202 | 0.064576 | 0.405753 | 0.6851 |
| NLKAPAS(–7) | 0.413895 | 0.064592 | 6.407790 | 0.0000 |
| NLKAPAS(–8) | –0.214715 | 0.067087 | –3.200556 | 0.0015 |
| NLKAPAS(–9) | –0.055670 | 0.067651 | –0.822903 | 0.4110 |
| NLKAPAS(–10) | 0.074199 | 0.065294 | 1.136378 | 0.2563 |
| NLKAPAS(–11) | –0.152102 | 0.064860 | –2.345099 | 0.0194 |
| C | –0.000534 | 0.001175 | –0.454670 | 0.6495 |
| R-squared | 0.120415 | Mean dependent var | | –0.000458 |
| Adjusted R-squared | 0.094340 | S.D. dependent var | | 0.027960 |
| S.E. of regression | 0.026608 | Akaike info criterion | | –4.385002 |
| Sum squared resid | 0.358254 | Schwarz criterion | | –4.254499 |
| Log-likelihood | 1160.485 | Hannan-Quinn criteria. | | –4.333887 |
| F-statistic | 4.618085 | Durbin-Watson stat | | 1.977661 |
| Prob(F-statistic) | 0.000000 | | | |

Note: * p-values and any subsequent tests do not account for model selection.
Source: Computation Using EVIEWS 10.

Table 8

| OUTCOMES OF ARDL MODEL FOR WELSPUN INDIA LTD. INDIA WITH SIGNIFICANT LAGS OF COTTON AND KAPAS PRICE AS REGRESSOR | | | | |
|---|---|---|---|---|
| Dependent Variable: NLWLSP | | | | |
| Method: Least Squares | | | | |
| Date: 07/14/23 Time: 17:03 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLWLSP(–2) | –0.113765 | 0.041505 | –2.740972 | 0.0063 |
| NLKAPAS(–7) | 0.417806 | 0.064051 | 6.523069 | 0.0000 |
| NLKAPAS(–8) | –0.201239 | 0.064055 | –3.141662 | 0.0018 |
| NLKAPAS(–11) | –0.144501 | 0.064142 | –2.252831 | 0.0247 |
| R-squared | 0.109133 | Mean dependent var | | –0.000458 |
| Adjusted R-squared | 0.103974 | S.D. dependent var | | 0.027960 |
| S.E. of regression | 0.026467 | Akaike info criterion | | –4.418234 |
| Sum squared resid | 0.362849 | Schwarz criterion | | –4.385608 |
| Log-likelihood | 1157.159 | Hannan-Quinn criteria. | | –4.405455 |
| Durbin-Watson stat | 1.908473 | | | |

Source: Computation Using EVIEWS 10.

Table 9

| OUTCOMES OF ARDL MODEL FOR ALOK INDUSTRIES LTD. WITH 12 LAGS DYNAMIC REGRESSORS OF COTTON AND KAPAS PRICE | | | | |
|---|---|---|---|---|
| Dependent Variable: NLALOK | | | | |
| Method: ARDL | | | | |
| Date: 07/10/23 Time: 16:39 | | | | |
| Sample: 4/01/2021 3/31/2023 | | | | |
| Included observations: 522 | | | | |
| Maximum dependent lags: 12 (Automatic selection) | | | | |
| Model selection method: Akaike info criterion (AIC) | | | | |
| Dynamic regressors (12 lags, automatic): NLCOTTON NLKAPAS | | | | |
| Fixed regressors: C | | | | |
| Number of models evaluated: 2028 | | | | |
| Selected Model: ARDL(1, 0, 0) | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-Statistic** | **Prob.*** |
| NLALOK(–1) | 0.058107 | 0.043797 | 1.326740 | 0.1852 |
| NLCOTTON | 0.040933 | 0.060447 | 0.677174 | 0.4986 |
| NLKAPAS | 0.099627 | 0.077572 | 1.284319 | 0.1996 |
| C | –0.001121 | 0.001408 | –0.796219 | 0.4263 |
| R-squared | 0.007500 | Mean dependent var | | –0.001058 |
| Adjusted R-squared | 0.001752 | S.D. dependent var | | 0.032051 |
| S.E. of regression | 0.032023 | Akaike info criterion | | –4.037070 |
| Sum squared resid | 0.531206 | Schwarz criterion | | –4.004444 |
| Log-likelihood | 1057.675 | Hannan-Quinn criteria. | | –4.024291 |
| F-statistic | 1.304805 | Durbin-Watson stat | | 1.995383 |
| Prob(F-statistic) | 0.272079 | | | |

Note: * p-values and any subsequent tests do not account for model selection.
Source: Computation Using EVIEWS 10.

India Ltd., 7th, 8th and 11th lag of the kapas price. Moreover, the coefficient of these lags is significant as the *p* values are less than 0.05, and the *R* squared is 0.109133 which implies that the selected explanatory variables can explain only 11% of the variation of dependent variables i.e., stock prices of Welspun India Ltd.

### Examining the impact of prices of kapas and cotton on the stock prices of Alok Industries

Table 9 represents the results of the ARDL model which is automatically selected from the models with 12 different lags, by EVIEWS 10 software based on AIC. The automatically selected model shows three explanatory lagged variables and a constant. Among these explanatory variables, only the present value of cotton seems significant as its *p* value is less than 0.05.

Moreover, the *R*-squared, i.e., coefficient of determination, is 0.0075 which depicts that the explanatory variables can hardly explain only 0.7% of the variation of dependent variables i.e., stock prices of Alok Industries. The model cannot be reframed as none of the lags is statistically significant.

After framing the ARDL models with significant lags, it is essential to examine the existence of a long-run correlation between the stock prices of textile companies and the prices of major raw materials i.e., cotton and kapas. For this long run form and bound test has been applied. The outcomes of the bound test are mentioned in table 10.

Table 10 depicts that the value of F-statistics in a bound test of all the selected textile companies is more than the upper bound of a 5% level of significance. Henceforth, stock prices of selected textile companies

Table 10

| OUTCOMES OF LONG-RUN FORM AND BOUND TEST | | | | |
|---|---|---|---|---|
| **F-Bounds Test** | | **Null Hypothesis: No levels of relationship** | | |
| **Stock prices of Page Industries, prices of cotton and kapas** | | | | |
| **Test Statistic** | **Value** | **Significance** | **I(0)** | **I(1)** |
| | | | Asymptotic: n=1000 | |
| F-statistic | 130.7683 | 10% | 2.63 | 3.35 |
| k | 2 | 5% | 3.1 | 3.87 |
| | | 2.5% | 3.55 | 4.38 |
| | | 1% | 4.13 | 5 |
| **Stock prices of KPR Mill, prices of cotton and kapas** | | | | |
| **Test Statistic** | **Value** | **Significance** | **I(0)** | **I(1)** |
| | | | Asymptotic: n=1000 | |
| F-statistic | 122.6567 | 10% | 2.63 | 3.35 |
| k | 2 | 5% | 3.1 | 3.87 |
| | | 2.5% | 3.55 | 4.38 |
| | | 1% | 4.13 | 5 |
| **Stock prices of Trident Group India, prices of cotton and kapas** | | | | |
| **Test Statistic** | **Value** | **Significance** | **I(0)** | **I(1)** |
| | | | Asymptotic: n=1000 | |
| F-statistic | 35.29554 | 10% | 2.63 | 3.35 |
| k | 2 | 5% | 3.1 | 3.87 |
| | | 2.5% | 3.55 | 4.38 |
| | | 1% | 4.13 | 5 |
| **Stock prices of Welspun India, prices of cotton and kapas** | | | | |
| **Test Statistic** | **Value** | **Significance** | **I(0)** | **I(1)** |
| | | | Asymptotic: n=1000 | |
| F-statistic | 74.96433 | 10% | 2.63 | 3.35 |
| k | 2 | 5% | 3.1 | 3.87 |
| | | 2.5% | 3.55 | 4.38 |
| | | 1% | 4.13 | 5 |
| **Stock prices of Alok Industries, prices of cotton and kapas** | | | | |
| **Test Statistic** | **Value** | **Significance** | **I(0)** | **I(1)** |
| | | | Asymptotic: n=1000 | |
| F-statistic | 116.0406 | 10% | 2.63 | 3.35 |
| k | 2 | 5% | 3.1 | 3.87 |
| | | 2.5% | 3.55 | 4.38 |
| | | 1% | 4.13 | 5 |

Source: Computation Using EVIEWS 10.

are correlated with the lag price of cotton and kapas in the long run.

## CONCLUSION

From the above analysis and results it can be witnessed that the stock prices of Page Industries are affected by lags of kapas only but the model seems weak as the *R*-squared is 0.0280 in the short-run. Similarly, the stock price of KPR Mill is affected only by the current price of cotton, the stock price of Trident Group is affected by the 2nd lag of cotton, 6th, 7th and 11th lag of kapas, with 0.034 R-squared and the stock price of Welspun India Ltd. is affected by 2nd lag of Welspun India's stock price itself, 7th, 8th and 11th kapas price with 0.11 *R*-squared in short-run. While considering the results of the ARDL model the model for Alok Industries cannot be reframed due to the absence of significant lags. All the ARDL models for the short run are considered as too weak as the coefficient of determination and adjusted *R*-squared are too low. On the other hand, while testing the data with long-run form and bound test (mentioned in table 10) of all the stock prices of selected textile companies, closing prices of cotton and kapas in the commodities market seems correlated but weak.

In the short run, stock prices of textile companies may be influenced by a wide range of factors such as quarterly earnings reports, company news, market sentiment, and short-term fluctuations in the overall stock market. Instead, the prices of cotton and kapas in the commodities market are driven by immediate supply and demand factors, weather conditions, geopolitical events, and changes in the global economy. These short-term factors might not always align perfectly with the performance of textile companies, leading to a weaker correlation between stock prices and commodity prices over shorter periods.

Additionally, stock prices can be influenced by market speculation and short-term trading activities, which can cause volatility and create divergence from underlying commodity prices.

Similarly, in the long run, the performance of textile companies is more likely to be influenced by the cost of their primary raw material, which is cotton in this case. As the textile industry heavily relies on cotton or kapas as a key input, changes in the cost of this raw material can significantly impact the profitability and overall performance of textile companies. Over time, the supply and demand dynamics for cotton and kapas tend to have a more pronounced effect on their prices, which then affects the profit margins and financial health of textile companies. As a result, in the long run, the correlation between stock prices of textile companies and cotton/kapas prices becomes more apparent and robust. It's essential to remember that correlations can change over time and might not always be stable due to varying market conditions, industry trends, and external events. Investors and analysts should consider multiple factors and conduct in-depth research to understand the relationships between different assets and industries accurately.

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