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# **Causal Association between BIST Indices and Energy and Food Prices**

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## **Extensive Summary**

### Introduction

Energy prices is a crucial economic factor especially for manufacturing firms in energy importing countries since it may affect many macroeconomic factors such as economic growth, inflation, and interest rates. Hence, many studies investigate the relation between energy prices and selected macroeconomic factors in different countries. Though there are many studies examining the in depth relation between these factors, the number of studies investigating the effects of macroeconomic factors on the performance of stock markets especially for emerging markets is limited.

There are many factors affecting the performance of stock markets such as inflation, interest rate, consumer confidence index, and energy prices which are also inter related. For instance, on the one hand, energy prices may affect macroeconomic factors and on the other hand macroeconomic factors may affect energy prices. Hence, stock prices can be affected by both of these endogenous and exogenous factors.

It is seen in literature that evidence on the relation between crude oil prices and stock market performance in inconclusive. Though some studies argue that energy prices do not affect stock market prices in many countries (Gay, 2016; Celik et al.,2015; Iscan, 2010), there are also studies reporting evidence on the strong association between crude oil prices and stock markets (Acaravci and Reyhanoglu, 2013; El-Sharif et al., 2005; Guler et al., 2010; Sener et al.,2013).

There is also no consensus on the direction of the effect of energy prices on stock market indices. In other words, though there are some studies concluding that an increase in oil prices affect stock market returns negatively, some other studies argue the opposite association. The aim of this study is to examine the relation between crude oil prices, food prices and BIST Industrials and Food Beverage indices. Up to our knowledge, there is no study investigating the effects of crude oil and food prices on BIST food and beverage index in Turkey. In this manner, this study fills the gap in the literature.

#### **Data and Methodology**

In addition to crude oil and food prices, three different BIST indices namely, BIST Industrial, BIST Food and Beverage and BIST 100 are examined for the time period from 1997:1 to 2016:4 in this study. Crude oil and food price data are retrieved from IFS (International Financial Statistics). Where as, BIST Industrial, BIST Food and Beverage and BIST 100 are gathered from BIST database. In order to examine the stationarity of the variables unit root tests (ADF, ADF-GLS, PP, KPSS, ERS-PO, Ng Perron) are run. Results indicate that all variables become stationary when first differences of the variables are taken. In other words, all variables are I(1). After examining the stationarity of the variables there are different alternatives in examining the causal associations between the variables.

As one of them, Johansen analysis is used to test cointegrating relations when the variables are not stationary at their levels but become stationary in taking the first differences (Johansen, 1988).

Vector Error Correction Model (VECM) can be estimated in order to investigate the long run and short run effect. VECM model is accepted to be a special case of VAR model. In other words, if the model is VAR model that is cointegrated, the model has an error correction mechanism. In this manner, this model shows us how the deviations in the long run are validated in the short run. The advantage of this approach is that it enables us both examine the short run and long run effects. In our study, after validating cointegrating relation we prefer to proceed to VECM analysis. Three different models are estimated in our analysis. The effects of food prices (GDF) and crude oil prices (PTR) on BIST 100 index (BIST), BIST Food and Beverage Index (BGD) and BIST Industrial Index (BSN) is estimated in the first second and third model respectively as below;

$$\Delta BIST_{t} = \gamma_{1_{0}} + \sum_{j=1}^{k} \gamma_{1_{1,j}} \Delta BIST_{t-j} + \sum_{j=1}^{k} \gamma_{1_{2,j}} \Delta GDF_{t-j} + \sum_{j=1}^{k} \gamma_{1_{3,j}} \Delta PTR_{t-j} + \theta \operatorname{IECT}_{r,t-k} + \varepsilon_{jt} (1)$$

$$\Delta BGD_{t} = \gamma_{2_{0}} + \sum_{j=1}^{k} \gamma_{2_{1,j}} \Delta BGD_{t-j} + \sum_{j=1}^{k} \gamma_{2_{2,j}} \Delta GDF_{t-j} + \sum_{j=1}^{k} \gamma_{2_{3,j}} \Delta PTR_{t-j} + \theta \operatorname{IECT}_{r,t-k} + \varepsilon_{jt} (2)$$

$$\Delta BSN_{t} = \gamma_{3_{0}} + \sum_{j=1}^{k} \gamma_{3_{1,j}} \Delta BSN_{t-j} + \sum_{j=1}^{k} \gamma_{3_{2,j}} \Delta GDF_{t-j} + \sum_{j=1}^{k} \gamma_{3_{3,j}} \Delta PTR_{t-j} + \theta \operatorname{IECT}_{r,t-k} + \varepsilon_{jt} (3)$$

#### **Empirical Findings**

Trace and maximum Eigenvalue statistics indicate only one cointegrating vector for all of the indices. The trace and maximum Eigenvalue statistics is 50.41 and 27.10 respectively when BIST 100 index is considered indicating the rejection of null hypothesis of no cointegrating vector. The trace and maximum Eigenvalue statistics is 45.59 and 25.63 when BIST Industrial index is considered. Finally, these statistics come out to be 35.01 and 24.25 for BIST Food and Beverage Index respectively. Hence, it is seen that the null hypothesis of no cointegrating vector is rejected for all three indices. However, it is also found that the null hypothesis of at most one cointegrating vector cannot be rejected for all of the BIST indices. These statistics indicate that these variables are integrated. After validating the cointegrating relations, we proceed to VECM analysis. In VECM analysis, a negative and significant error correction term is necessary in order to validate the long run relation (Arisoy, 2005: 12). Preliminary results indicate that all of the error correction terms in our models are negative and significant. This result indicates that our model specification is valid for each model. After examining the long run effect, we proceed to short run dynamics in our analysis. Short run dynamics do not indicate any significant short term effect for each of the models in our analysis.

## **Concluding Remarks and Discussion**

Empirical findings indicate that together with food prices crude oil prices affect each of the indices namely, BIST 100, BIST Industrials and BIST food and Beverage. These results are in line with Abdioglu and Degirmenci (2014), Miller and Ratti (2009) and Kapusuzoglu (2011). Though crude oil prices are driven by many international factors such as economic activities, supply and demand, it may also affect many economic factors, hence the stock market in a local economy. Any increase in oil prices possibly result in an increase in production costs which cause economic activities slow down. When output level decrease due to the low economic activity, domestic capital may decrease which at last lowers the cash flows available to the firms. The decreased amount of cash flows to the firms possibly reduce the value of these firms which in turn negatively affect the performance of these firms in stock markets. On the other hand, food prices may also affect firms especially operating in foods and beverage sector. Any increase in food and beverage prices may result in lower sales which in turn cause low cash flows available to the firms. This may also negatively affect the stock market performance of these firms. Evidence on the effect of crude oil prices on stock market performance of the firms in Turkey is inconclusive. Though, there are many reasons of this outcome. One of the main rationales behind this conclusion is that different sectors in BIST may be affected by different transmission mechanisms which in turn result in unique effects of crude oil prices on these sectors. To better comprehend with the effects of crude oil prices on stock market performance of firms, studies working on this issue should focus on the in depth relation and transmission mechanisms between special BIST sectors and crude oil prices. Up to our knowledge, there is no tusy examining the relation between food prices and stock market in Turkey. Hence, by filling this gap in literature, this study is expected to be useful for researchers working on this issue.