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ABSTRACT

This study examines the asymmetric effects of the gold price, the USD/TRY exchange rate, the corporate governance index, and the 10-year government bond yield on the BIST100 index, thus delving into the intricate web of financial markets. Using weekly data from September 2007 to September 2023, we employed the nonlinear ARDL model to examine the asymmetric effects of the variables on the BIST100 index. As a result, the nonlinear ARDL bound test proved the long-term cointegration between the BIST100 index and the explanatory variables used in the analysis. All asymmetric variables except the negative variable of gold price had statistically significant long-run effects on the BIST100 index. Government bond yields and gold price had negative effects on the stock index, while USD/TRY exchange rate and corporate governance index had positive effects on it. The Wald test's null hypothesis of no long-term asymmetries was rejected for government bond yields, the USD/TRY exchange rate, and the corporate governance index. On the other hand, the test for short-term asymmetry was rejected only for the corporate governance index. Accordingly, the corporate governance index has both short-term and long-term asymmetric effects on the BIST100 index, while government bond yields and the dollar exchange rate have only long-term asymmetric effects on it.

ÖZ

Bu çalışmada altın fiyatları, USD/TRY döviz kuru, kurumsal yönetim endeksi ve 10 yıllık tahvil getirilerinin BIST100 endeksi üzerindeki asimetrik etkileri incelenmiştir. Analizde Eylül 2007-Eylül 2023 dönemini kapsayan haftalık veriler kullanılarak, değişkenlerin BIST100 endeksi üzerindeki asimetrik etkileri doğrusal olmayan ARDL sınır testi yardımıyla araştırılmıştır. Sonuç olarak, doğrusal olmayan ARDL sınır testi, BIST100 endeksi ile açıklayıcı değişkenler arasında uzun dönemli bir eşbütünleşme ilişkisi olduğunu göstermiştir. Negatif altın fiyatları değişkeni hariç tüm asimetrik değişkenlerin BIST100 endeksi üzerinde istatistiksel olarak anlamlı bir etkiye sahip olduğu görülmüştür. Buna göre, tahvil verimliliği ve altın fiyatları BIST100 endeksini negatif yönde etkilerken, USD/TRY döviz kuru ve kurumsal yönetim endeksi BIST100 üzerinde pozitif etkilere sahiptir. Asimetrik etkilerin olmadığını ifade eden Wald testinin boş hipotezi 10 yıllık tahvil verimliliği, USD/TRY döviz kuru ve kurumsal yönetim endeksi için reddedilmiştir. Öte yandan, kısa dönem asimetri testi sadece kurumsal yönetim endeksi için reddedilmiştir. Sonuç olarak, kurumsal yönetim BIST100 endeksi üzerinde hem kısa dönemli hem de uzun dönemli asimetrik etkilere sahipken, on yıllık tahvil verimliliği serisi ve dolar kurunun BIST100 endeksi üzerinde sadece uzun dönemli asimetrik etkileri bulunmaktadır.

INTRODUCTION

Stock markets are essential pillars of modern economies. They provide opportunities for capital accumulation, wealth creation, and risk management, and thus for economic health. They are not only indicators of economic health, but also drivers of innovation, job creation, and global economic integration. In this context, recognizing the importance of equity markets is fundamental to understanding the interconnectedness of finance, the economy, and society and their critical role in shaping our financial future. The importance of equity markets goes beyond financial structure and impacts various aspects of the economy and society, such as liquidity, risk diversification, economic indicators, job creation, pension funds and retirement planning, innovation and technology, global capital flows, etc. Financial markets can create capital formation by raising capital for businesses (Machlup, 1940; Kanasro et al., 2011; Mishkin, 2012). Companies, both established and start-up, can issue shares to the public and raise funds for expansion, research and development, and other growth initiatives (Smith, 1988; Erel et al., 2012). This access to capital fosters entrepreneurship and economic development. Stock markets can facilitate wealth creation by allowing individuals and institutions to invest their savings and grow their wealth over time. By purchasing shares of publicly traded companies, investors can benefit from capital appreciation and dividend income. Owning stocks allows investors to participate in the success of companies and helps individuals build wealth and secure their financial future. Financial markets also promote transparency and good corporate governance (Cheung & Chan, 2004; Jordan, 2004). Listed companies are subject to strict reporting and disclosure requirements that promote accountability and protect interests of shareholders. This accountability contributes to ethical business practices and reduces the risk of fraud or mismanagement. Another important impact of financial markets is job creation. The growth of companies financed through equity markets leads to job creation. As companies expand, they hire more workers, contributing to lower unemployment rates and economic prosperity. Finally, equity markets affect innovation and technology, as well as global capital flows. Stock markets reward innovation and technological progress. Companies with breakthrough ideas and technologies often go public to raise capital for research and development. This stimulates technological progress and economic growth. They facilitate cross-border investment. International stock exchanges allow foreign investors to participate in the growth of other countries' economies. This global flow of capital increases economic interdependence and cooperation.

Securities markets are affected by many economic dynamics, such as exchange rates, gold prices, corporate governance, and government bonds (Abdalla & Murinde, 1997; Aydemir & Demirhan, 2009; Ehrmann et al., 2011; Gadanecz & Mehrotra, 2013; Sensoy & Sobaci, 2014; Erdoğan et al., 2020; He et al., 2023). Among other factors, exchange rates have a direct impact on the attractiveness of a country's stock market to foreign investors. The interaction between exchange rates and stock markets is a complex and multi-layered relationship that can have a significant impact on investors, companies, and the economy as a whole. A weaker local currency can make domestic assets more attractive to foreign investors, who can buy more shares for the same amount of their own currency (Emsen, 2022; Şenol & Selahattin, 2018). Conversely, a strong local currency may discourage foreign investment in the BIST100. Therefore, exchange rate fluctuations may lead to shifts in foreign portfolio investment and thus affect overall market performance (Daly, 1993). Moreover, the exchange rate has a significant impact on the international competitiveness of domestic goods (Ayhan, 2019; Barak & Naimoğlu, 2018). When the Turkish lira is weak relative to other major currencies, Turkish exports become more affordable for foreign buyers, which can boost the performance of export-oriented companies listed in the BIST100. On the other hand, a strong lira can benefit import-dependent companies by lowering the cost of foreign goods and inputs. Gold is an alternative asset for investors, and the price of an alternative would have a strong impact on the stock market (Gokmenoglu & Fazlollahi, 2015; Arouri et al., 2015; Ali et al., 2020; Sidhu & Katoch, 2021). It can be concluded that fluctuations in the gold price can affect investor

sentiment, portfolio allocation, and the performance of the BIST100 index (Gazel, 2016; Emeç & Demirdöğen, 2022). Investors and market participants should closely monitor the movements of gold prices along with other economic and geopolitical factors to make informed decisions about their investments in both gold and equities (İlkhan et al., 2022). In addition, understanding the dynamic interplay between gold and the equity market is critical for managing risk and optimizing investment strategies in an ever-changing financial landscape. Finally, rising or falling government bond yields can have significant effects on the stock market (Clare et al., 1994; Ilmanen, 2003; Durré & Giot, 2007; Waldenström, 2014; Uyar et al., 2016). These effects are mainly driven by changes in interest rates, investor sentiment, and the relative attractiveness of different asset classes. The most important effect of government bond yields on the stock market is interest rate expectations (Deacon & Derry, 1994; De Rezende, 2017), as government bonds are considered relatively safe assets with predictable yields. When yields on these securities rise, they become more attractive to income-seeking investors. As a result, some investors may shift their capital from riskier assets to government bonds in search of higher returns on fixed income securities. This shift in capital allocation may lead to a decline in demand for equities, which may put downward pressure on equity prices. An increase in government bond yields usually leads to higher interest rates across the economy (Chadha et al., 2013; Pratiwi & Mustafa, 2021). Higher interest rates mean that companies, including publicly traded companies, often face higher borrowing costs when they need to raise capital by issuing bonds or loans. Higher borrowing costs can affect corporate profitability and reduce the attractiveness of stocks. As a consequence, the stock prices of some companies may decline as investors reevaluate their investments in light of higher interest costs. Changes in government bond yields can also affect equity valuations. Many investors use discounted cash flow (DCF) models to value stocks. These models discount future cash flows to their present value using a discount rate that often includes government bond yields. When bond yields rise, the discount rate in DCF models also rises, which can lead to lower valuations for stocks. Lower valuations can affect investors' perceptions of a stock's intrinsic value, potentially leading to lower stock prices. Finally, government bond yields often incorporate inflation expectations (Cieslak & Pflueger, 2023). If yields rise due to higher inflation expectations, investors may become concerned about the purchasing power of future cash flows from stocks. Higher inflation expectations may lead to higher discount rates in valuation models, which could lower stock prices.

NARDL MODEL

The nonlinear ARDL (NARDL) method is a powerful tool for modeling and investigating linear (nonlinear) relationships in time series data (Liang, Troy, & Rouyer, 2020; Allen & McAleer, 2021; Arı, 2022). Its main strength lies in its ability to capture and quantify asymmetries, which makes it valuable for understanding how variables respond to altered conditions or shocks. Researchers in economics, finance, and social sciences often use NARDL to gain deeper insights into complex and nonlinear data patterns. In this paper, we use the NARDL method proposed by Shin, Yu, and Greenwood-Nimmo (2014) to examine the long- and short-term asymmetric effects of the USD/TRY exchange rate, gold price, yield ratio of government bond, and corporate governance index on the BIST100 index. The NARDL approach is a superior method because it can estimate the potentially different asymmetric behavior in the increase and decrease of the explanatory variables, regardless of whether the regressors are I (0), I (1), or cointegrated with each other. The econometric model of the study is as follows:

$$BST_t = c+\beta^+ ALT_t^+ + \beta^- ALT_t^- + \theta^+ DBS_t^+ + \theta^- DBS_t^- + \eta^+ USD_t^+ + \eta^- USD_t^- + \varphi^+ KYT_t^+ + \varphi^- KYT_t^- + \varepsilon_t \quad (1)$$

Here BST is BIST100 index, *ALT* is gold prices series, *DBS* is government bond yield series, *USD* is USD/TRY exchange rate series, and *KYT* is corporate governance index series. Additionally, c is constant term, $\beta^+,\beta^-,\theta^+,\theta^-,\eta^+,\eta^-,\varphi^+,\varphi^-$ are slope parameters and ε_t is error terms. The asymmetric error correction model can be written as in Equation 2:

$$\Delta BST_t = \rho BST_{t-1} + \alpha^+ ALT^+_{t-1} + \alpha^- ALT^-_{t-1} + \lambda^+ DBS^+_{t-1} + \lambda^- DBS^-_{t-1} + \varsigma^+ USD^+_{t-1} + \varsigma^- USD^-_{t-1} + \pi^+ KYT^+_{t-1} + \pi^- KYT^-_{t-1} + \sum_{j=1}^{p-1} \gamma_j \Delta BST_{t-j} + \sum_{j=1}^{q-1} (\vartheta_j^+ \Delta ALT^+_{t-j} + \vartheta_j^- \Delta ALT^-_{t-j}) + \sum_{j=1}^{q-1} (\delta_j^+ \Delta DBS^+_{t-j} + \delta_j^- \Delta DBS^-_{t-j}) + \sum_{j=1}^{q-1} (\partial_j^+ \Delta USD^+_{t-j} + \partial_j^- \Delta USD^-_{t-j}) + \sum_{j=1}^{m-1} (\psi_j^+ \Delta KYT^+_{t-j} + \psi_j^- \Delta KYT^-_{t-j} +) + \epsilon_t \quad (2)$$

Testing the asymmetric cointegration has the same procedure as the bounds testing approach of ARDL method proposed by Pesaran, Shin, and Smith (2001). After proving cointegration between

Next, long-run and short-run asymmetries of USD/TRY exchange rate, gold prices, government bond yield ratio, and corporate governance index are tested by performing the Wald test.

DATA AND ANALYSIS

The stock market is affected by many economic phenomena due to its complicated and interdependent structure. We examine the asymmetric effects of the exchange rate, the gold price, the government bond yield, and the corporate governance index calculated for the stocks traded on the Istanbul Stock Exchange. Since the corporate governance index has been calculated since 2007, the time span in this study is from September 2007 to September 2023. We used weekly data to better capture the pass-through between the variables, as using monthly, quarterly, and annual data would have reduced the degrees of freedom and may not have fully reflected the volatility in the structure of the variables.

Figure 1 shows the weekly observation graph of KYT, BST, ALT, USD and DBS series from September 2007 to September 2023. KYT and BST almost overlap, while the trend of BST and USD is parallel. ALT and DBS have a similar cycle with periods of expansion and contraction. However, the upward and downward trends of these two variables do not coincide with the trend of the BST variable. DBS and ALT generally follow a downward trend when the BST variable increases, and DBS and ALT move in the opposite direction when the BST decreases.

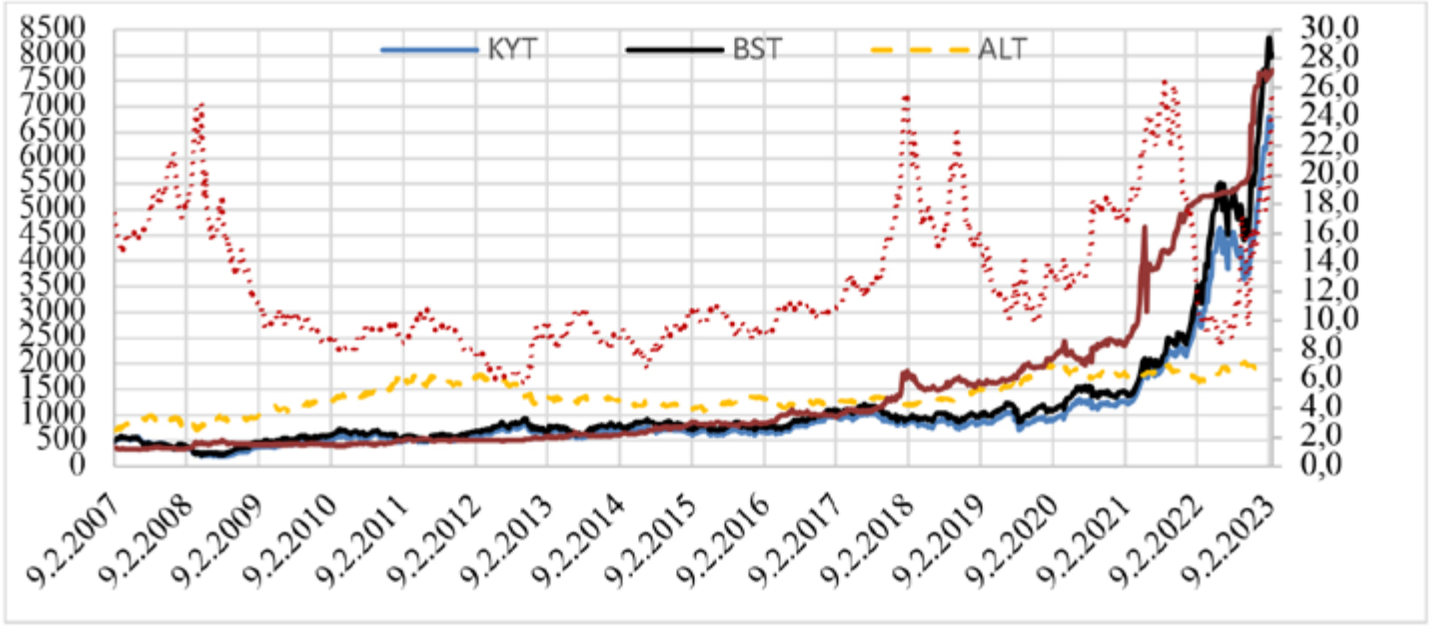

Figure 1. The Graph of Variables

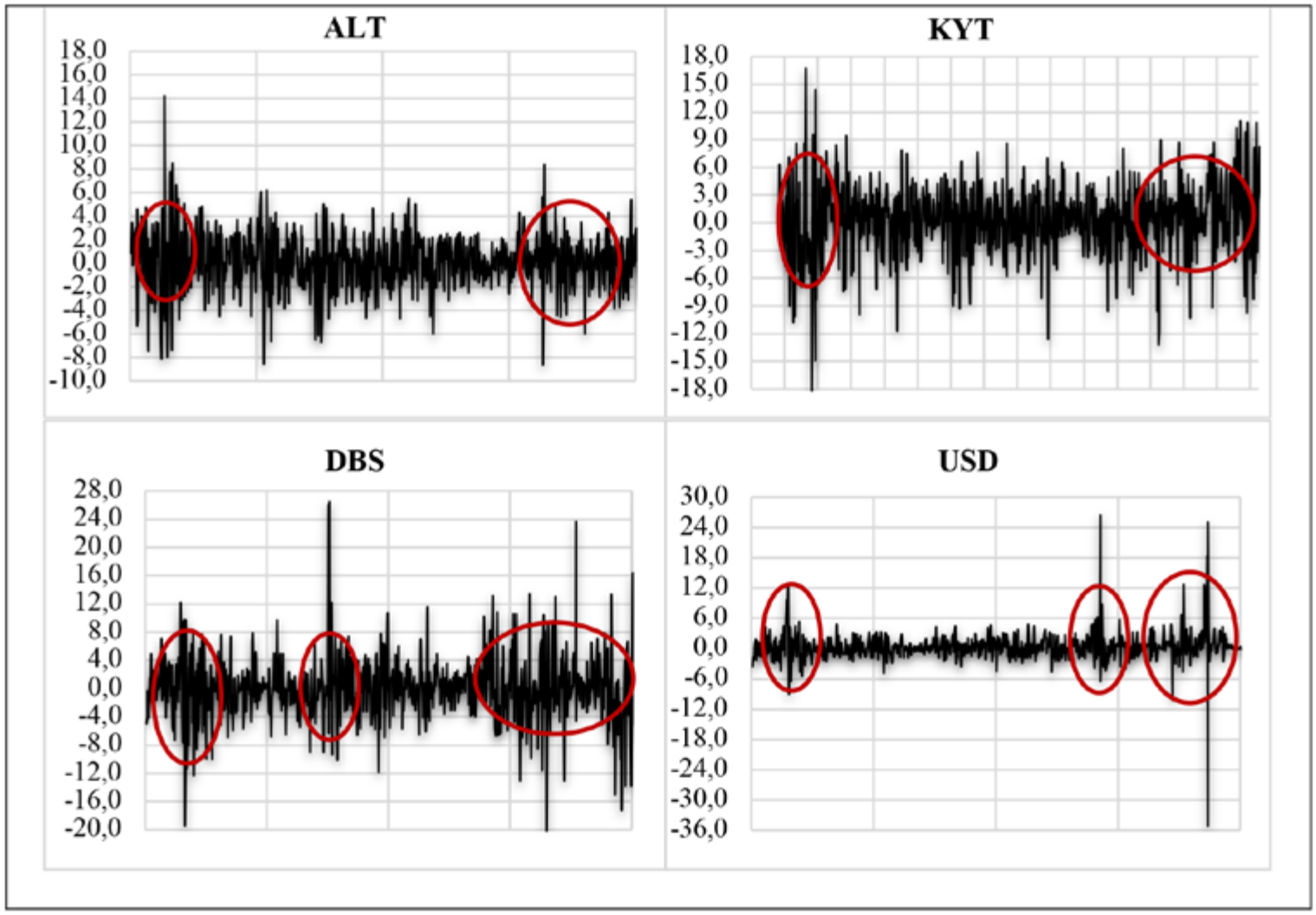

Figure 2. The Return of Variables

Figure 2 shows the return series of the explanatory variables. USD/TRY has the highest fluctuation rate from -36% to 28%. In general, Türkiye has experienced three dramatic shocks to the USD/TRY exchange rate. The first fluctuation occurred at the end of 2008, the second in July 2018, and the last shock covered a large period from 2020 to today. These fluctuations are reflected in the graph. All variables show similar volatility at the beginning and end of the analysis period. Although the fluctuation intervals of the series are close to each other, the wavelengths of the USD/TRY exchange rate seem to be quite short when volatility is low than when volatility is high. The reason why the USD exchange rate seems to fluctuate in a narrower range than the other series is that the appreciations and depreciations during the crisis periods were very large. The fluctuations during this period are so large that the fluctuations during all other periods appear insignificant. However, if the periods other than the crisis periods were plotted on a graph, the magnitude of the fluctuations would become much clearer.

Table 1. The Summary Statistics

	BST	ALT	USD	KYT	DBS
Mean	6.791	7.212	1.219	6.658	2.474
Median	6.688	7.183	1.047	6.556	2.374
Maximum	9.027	7.618	3.302	8.824	3.286
Minimum	5.392	6.552	0.142	5.262	1.744
Std. Dev.	0.649	0.240	0.829	0.638	0.337
Skewness	1.130	-0.381	0.797	1.059	0.383
Kurtosis	4.966	2.594	2.624	4.899	2.351
Observations	838	838	838	838	838

Table 1 presents the descriptive statistics of the variables used in the analysis. All variables are presented in logarithmic form. Standard deviation is a measure of volatility. Accordingly, the USD variable has the highest volatility with a standard deviation of 0.829, while ALT has the lowest volatility with a standard deviation of 0.240. Gold is often considered a safe haven for investors. This is because gold price series are relatively stable and do not rise or fall too much. The statistics in the table prove the stability of gold price series. The median and mean for gold price are very close. In addition, the fluctuation range is smaller compared to other variables. All these statistics prove why gold is one of the most reliable investment instruments for investors. In contrast, the exchange rate is much more volatile compared to other variables. The USD fluctuated within a range of about 2225% from its minimum value to its maximum value. In this sense, the exchange rate can be considered as a riskier investment instrument than any other instrument. After the summary statistics have been evaluated, the analysis phase can be carried out. However, at the beginning of the analysis, the variables should be tested for their unit root. We prefer the Ng-Perron unit root test here because it gives superior results than the ADF and PP tests. The following table shows the test statistics of the variables at the level and their first difference, as well as the critical values for each confidence level.

Table 2. Ng-Peron Unit Root Test

Variables	**Trend and Constant**				**Constant Only**			
	MZa	**MZt**	**MSB**	**MPT**	**MZa**	**MZt**	**MSB**	**MPT**
BST	0.31	0.11	0.36	39.34	4.49	3.47	0.77	73.90
D(BST)	-81.70	-6.39	0.08	1.12	-22.02	-3.31	0.15	1.15
ALT	-3.71	-1.35	0.36	24.37	0.56	0.55	0.98	61.90
D(ALT)	-417.82	-14.45	0.03	0.22	-414.45	-14.39	0.03	0.06
DBS	-4.98	-1.40	0.28	17.48	-4.29	-1.41	0.33	5.80
D(DBS)	-36.67	-4.26	0.12	2.59	-3.01	-0.98	0.33	7.72
USD	0.37	0.18	0.48	59.84	2.88	5.14	1.79	291.86
D(USD)	-16.09	-2.83	0.18	5.72	-5.99	-1.68	0.28	4.26
KYT	0.37	0.14	0.39	43.67	4.68	3.26	0.70	62.36
D(KYT)	-418.00	-14.46	0.03	0.22	-417.99	-14.46	0.03	0.06
Significance	Critical Values							
1%	-23.800	-3.420	0.143	4.030	-13.800	-2.580	0.174	1.780
5%	-17.300	-2.910	0.168	5.480	-8.100	-1.980	0.233	3.170
10%	-14.200	-2.620	0.185	6.670	-5.700	-1.620	0.275	4.450

Table 2 shows the results of the Ng-Peron unit root test for the variables. BST is the dependent variable of the NARDL model and therefore it must be I(1) to satisfy the assumption of the model. Accordingly, the null hypothesis of a unit root cannot be rejected at the usual significance levels. For the differentiated BST variable, however, the null hypothesis is rejected at all significance levels, leading us to conclude that the variable BST is I(1). The ARDL or NARDL model assumes that the regressors can be I(0) or I(1), but not I(2). The Ng-Peron test proves stationarity of first differencing for all explanatory variables. In other words, all variables used in the analysis, including the dependent variable, are I(1). The unit root test is the first step of the analysis, and the second step is to determine the lag structure between the dependent and independent variables using VAR analysis. The ARDL or NARDL cointegration test must be performed with a fixed lag of the variables. The lag lengths of the dependent and independent variables must not change during the NARDL cointegration test. After the cointegration between the variables is established and in the stage of calculating the long-run coefficients, the lags of the variables are allowed to differ. Therefore, the NARDL bounds test should be performed with a constant number of lags determined as a result of the VAR model for both the dependent and independent variables.

Table 3 includes the results of the NARDL cointegration test and the VAR analysis. The VAR analysis suggests 1, 2, or 3 lags for the cointegration test according to the information criteria SC, HQ, and AIC, respectively. We preferred to use the AIC or SC information criteria in this paper. Therefore, the NARDL cointegration test is performed with fixed one- and two-level lags for all variables. The result of the NARDL cointegration test proves the long-run relationship between the variables for both one- and two-level fixed lags of the variables. The NARDL test statistics are 4.806 and 5.528 for the test with 1 and 2 lags, respectively.

Table 3. NARDL Bound Test and VAR Analysis Results

F-Bounds Test				
	Test Statistic	**Sig. Level**	**I(0)**	**I(1)**
F-statistic (1 lag)	**4.806**	1%	1.85	2.85
F-statistic (2 lags)	**5.528**	5%	2.11	3.15
		10%	2.62	3.77
VAR Analysis				
Number of Lags		**AIC**	**SC**	**HQ**
0		-5.241508	-5.190263	-5.221855
1		-46.47687	**-45.96442***	-46.28034
2		-46.7313	-45.75765	**-46.35790***
3		**-46.75460***	-45.31975	-46.20433
4		-46.72199	-44.82593	-45.99483
5		-46.71292	-44.35566	-45.80889

Null Hypothesis for NARDL Bound Test: No levels relationship

Table 4 shows the estimated long-run coefficients of the NARDL model, the coefficients of the conditional error correction regression, the diagnostic test results, the long-run asymmetry test of Wald, and the long-run asymmetry test of Wald. According to the results, all the long-run asymmetry coefficients are statistically significant, except for the negative asymmetry coefficient of ALT. An increase in the price of gold would lead to a 0.2364% decrease in the BIST100 index. Overall, government bonds have a negative and statistically significant impact on the BIST100 index. The positive coefficient of government bond yield is almost twice as large as the negative coefficient. A 1% increase in the government bond yield would result in a 0.1527% decrease in the BIST100 Index, while a 1% decrease in the government bond yield would only result in a 0.0853% decrease in the BIST100 Index. USD/TRY and Corporate Governance Index have a positive and statistically significant impact on the BIST100 Index. A 1% increase in the USD/TRY exchange rate and Corporate Governance Index would result in a 0.1680% and 0.9737% increase in the BIST100 Index, respectively. Conversely, a 1% decrease in the USD/TRY exchange rate and the Corporate Governance Index would increase the BIST100 by 0.2695% and 0.6662%, respectively. When we compare the coefficients, we conclude that the largest coefficients for both positive and negative asymmetries belong to the Corporate Governance Index. The results of the conditional error correction regression estimated by the stepwise regression method are shown on the right side of Table 4. We omit the explanatory variables that have a significance level of 5% or less. The error correction coefficient is negative and statistically significant. The coefficient implies that 0.0879 of a shock to the BIST100 index would be removed in one week. Thus, the total effect of a shock on the BIST100 index disappears after about 11 weeks.

Table 4. NARDL Long-run Coefficients, Error Correction Regression and Asymmetry Test

Long-Run Asymmetric Coefficients				Conditional Error Correction Regression			
Variable	**Coeff.**	**Std. Error**	**Prob.**	**Variable**	**Coeff.**	**Std. Error**	**Prob.**
Dependent Variable: BST				**Dependent Variable: D(BST)**			
ALT_P	-0.2364	0.068	0.0005	**Constant**	0.5212	0.079	0.0000
ALT_N	0.0348	0.040	0.3813	**BST(-1)**	-0.0832	0.013	0.0000
DBS_P	-0.1527	0.029	0.0000	**ALT_P**	-0.0202	0.006	0.0011
DBS_N	-0.0853	0.033	0.0100	**ALT_N**	0.0033	0.003	0.3358
USD_P	0.1680	0.056	0.0026	**DBS_P(-1)**	-0.0125	0.003	0.0000
USD_N	0.2695	0.088	0.0023	**DBS_N(-1)**	-0.0073	0.003	0.0259
KYT_P	0.9737	0.047	0.0000	**USD_P(-1)**	0.0136	0.005	0.0035
KYT_N	0.6662	0.052	0.0000	**USD_N(-1)**	0.0230	0.007	0.0015
Constant	6.2547	0.025	0.0000	**KYT_P(-1)**	0.0818	0.012	0.0000
ARCH Test		**LM Test**		**KYT_N(-1)**	0.0555	0.011	0.0000
				D(KYT_N)	0.9148	0.019	0.0000
Test Stat.	**Prob.**	**Test Stat**	**Prob.**	**D(KYT_P)**	0.9487	0.021	0.0000
3.156	0.0760	1.797	0.1665	**D(USD_P)**	-0.1051	0.023	0.0000
Variable		**Wald.L**	**Wald.S**	**D(DBS_N)**	-0.0519	0.013	0.0001
DBS		**3.386***	Null	**D(KYT_N(-1))**	0.1471	0.029	0.0000
				D(BST(-1))	-0.0702	0.019	0.0002
USD		**4.940****	0.086	**D(USD_N(-1))**	-0.0493	0.024	0.0388
KYT		**12.062*****	**6.836*****	**D(USD_N(-2))**	-0.0455	0.022	0.0402
				CointEq(-1)	**-0.0879**	**0.011**	**0.0000**

Note: (*), (**) and (***) are significant levels at 10%,5% and 1%, respectively.

The diagnostic test must be performed to indicate the validity of the estimated regression model. Therefore, we performed the ARCH test for heteroscedasticity and the LM test for serial correlation. Both tests show that the estimated models are valid. The next step is to examine the long-run and short-run asymmetry tests using the estimated coefficients. In the table, the test for long-run asymmetric effects is labeled Wald.L, while the test for short-run asymmetric effects is labeled Wald.S. In the table, there are no asymmetry tests for ALT. This is because the long-run coefficient of ALT _P, which expresses the increase in gold prices, is statistically significant, while the coefficient of ALT _N is not. Therefore, no asymmetry tests are performed for a non-significant coefficient. The test for long-term asymmetric effects was performed for DBS, but the test for short-term asymmetric effects could not be performed because there is no coefficient for D(DBS_P) in the conditional error correction regression. Accordingly, the null hypothesis that the coefficients of DBS_P and DBS_N are equal is rejected at the 10% level. The Wald test, calculated at 3.386, suggests that domestic government bond yields have asymmetric effects on the BIST100. According to the long-run coefficients, the effect of an increase in productivity GDS on the BIST100 is twice as large as the effect of a decrease in productivity GDS. In other words, an increase in interest rates has a much larger effect on the BIST100 index than a decrease. Both long-run and short-run asymmetry tests were conducted for the USD coefficient. The Wald value of the long-run asymmetry test is calculated to be 4.94. The null hypothesis that USD_P=USD_N is rejected at a 5% significance level for this value. The effects of exchange rate appreciation and depreciation on the BIST100 are not equal. Exchange rate depreciation has a larger impact on the BIST100 than appreciation. The short-term test statistic for the USD is calculated as 0.086. This test statistic cannot be rejected at any significance level. Thus, while the short-run impact of the exchange rate on the BIST100 index is symmetric, the long-run impact of the USD variable is asymmetric. Finally, the short-run and long-run Wald test statistics for the KYT variable are calculated to be 12.062 and 6.836, respectively. Both values show that the null hypothesis Ho is rejected at all significance levels. This means that increases and decreases in the KYT variable do not have the same effect on the BIST100. According to the long-run coefficients, an increase in KYT leads to a 0.9737% increase in the BIST100, while a decrease in KYT leads to a 0.6662% increase in the same variable. These coefficients are not statistically equal. In other words, an increase in KYT has a much larger effect on BIST100.

DISCUSSION

Gold, foreign exchange and government bonds are alternatives to the stock market. A fluctuation in these indicators naturally affects the stock market, and a fluctuation in the stock market naturally affects other markets (Siddiqui & Roy, 2019; Okere et al., 2021; Kumar et al., 2023). In this study, we used four different indicators that are likely to affect the BIST100 index, but many factors such as inflation rates, crises, and shocks affect the stock markets (Bekaert & Engstrom, 2010; Ambros et al., 2021; Ahmed et al., 2023). The fact that some factors are not directly observable and some data are published at most monthly led us to use the price of gold, government bond yields, the dollar exchange rate, and corporate governance data. Economics explains the movements and correlations of these markets on a theoretical basis. In reality, inflation and interest rates underlie nearly all factors. The real interest rate is the difference between the nominal interest rate and the expected inflation rate. An increase in the inflation rate leads to an increase in inflation expectations (Chernov & Mueller, 2012; Coibion et al., 2020) and thus to an increase in the nominal interest rate. When analyzing the main determinants of inflation in Türkiye, the most important trigger is the exchange rate (Kandil et al., 2007). Türkiye imports a significant share of its intermediate goods, including exports. A high import ratio means that the prices of all consumer goods are sensitive to the exchange rate. As a result, the exchange rate has a direct impact on inflation. High inflation means high interest rates (Cologni & Manera, 2008). Interest rates, in turn, directly affect investment instruments such as the price of government bonds, the stock market and gold (Cengiz, 2010; Tily, 2012). At this point, an increase in interest rates leads to an increase in the productivity of government bonds. High interest rates lead to high risk-free returns for fund owners. Investors will invest their savings in deposit

accounts rather than in assets such as bonds, the stock market, or gold. Therefore, demand for bonds will decline. A decrease in the demand for bonds will lead to a decrease in the price of bonds and thus an increase in the interest rate, which expresses the return on bonds. Consequently, bond prices, exchange rates, gold prices and the stock market index as a whole are influenced by similar macro variables and interact with each other.

Our results are in line with economic expectations. Gold, government bonds and the exchange rate offer investors alternative investment instruments to the stock market. An increase in the price of gold will result in more funds flowing into this market, i.e., the share of funds in the stock market will decrease. A decrease in funds in the stock market will lead to a decrease in demand and thus a decrease in the BIST100 index. Therefore, an increase in the price of gold and government bond yields will lead to a decrease in the BIST100 index. The situation is somewhat different for the exchange rate. As mentioned earlier, an increase in the exchange rate puts upward pressure on inflation. An increase in the price of goods and services leads to an increase in the price of stocks, which behave exactly like goods or services. Another effect of the exchange rate is reflected in the stock market through exports. A decrease in the value of the local currency against a foreign currency means that domestically produced goods and services are cheaper abroad. As a result, an increase in the exchange rate leads to an increase in exports and an improvement in the outlook for the balance sheets of exporting companies. The demand for the shares of highly profitable company increases, and this increase in demand leads to an increase in the BIST100 index as a whole. The results of the analysis show that gold, government bonds and the exchange rate of the BIST100 are exactly in line with theoretical expectations.

CONCLUSION

This study examines the impact of gold price, USD exchange rate, government bond yields, and corporate governance index, which expresses the degree of institutionalization of listed companies, on the BIST100 index for the period between 2007 and 2023. The results show that gold price and government bond yields have a negative impact on the BIT100, while USD exchange rate and corporate governance index have a positive impact on the BISTY100. According to the NARDL model, the Corporate Governance Index variable has the highest coefficient. The results of the model also show that an increase in the gold price lowers the BIST100 index, while a decrease in the gold price has no statistically significant effect on the index. In the long run, the corporate governance index, the USD exchange rate, and the government bond variables have asymmetric effects on the BIST100. However, in the short run, only the corporate governance index has asymmetric effects. According to the error correction model, about 9% of a shock to the BIST100 index stabilizes after one week. This means that a shock to the BIST100 index fully stabilizes after about 12 weeks or three months.

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