

## Modeling of the Relationship Between BIST100 Index and Central Bank Interest Decisions by the Quantitative Decision Method

### ABSTRACT

Central banks, which have the power to control and shape markets, apply various monetary policies to protect the monetary value of the country which they are affiliated with and to ensure financial stability. The monetary policy measures implemented have a direct or indirect effect on all market movements. Determining the most appropriate interest rates simultaneously with market conditions is one of the most important monetary policy measures. In this study, the impact of the decision of the Central Bank of the Republic of Turkey (TCMB) on the maximum interest rate applied to deposits between January 2010 and February 2022 in the BIST 100 Index, which is traded with the code XU100 on Borsa Istanbul (BIST), was investigated. For this purpose, an exponential composite variable was created based on interest rate and stock market index value change rates. Then, linear decision methods based on logarithmic transformation were applied and the relationship model was expressed mathematically. As a result, a statistically significant and 95% strong relationship was found between the interest rate decisions of TCMB and the movements of BIST 100 index.

**Keywords:** Interest Rate, BIST 100 Index, Quantitative Decision Methods, Correlation Analysis, Linear Regression Mode

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### INTRODUCTION

Central banks, which are among the most important institutions that shape the world financial history, monitor the financial markets, manage the volume of the national currency and monetary policies. Central banks use monetary policy decisions and monetary transmission mechanisms. Central banks, which have the power to manage and shape the markets, use this power; they use it to protect the value of the country's currency and to ensure price stability. The Monetary Policy Committee (MPC), which is within the institutional structure of the CBRT, regulates interest rates with the monetary policies it implements and thus directly affects the financial markets. These policy decisions of the MPC may affect not only the Turkish financial system, but also other markets to which it is connected. The factor that creates this effect is realized through the money transfer mechanisms created by the MPC's interest and similar decisions. money transfer; It is the process that determines the demand of monetary changes and the direction of the products being affected (Alkan, 2016: 153). As a natural consequence of this process, investment decisions are also affected. Interest rates are determinant on investments and consumption expenditures.

Stock exchanges are important institutions that mediate the evaluation of investments in capital markets. Stocks are one of the main investment instruments in financial markets. BIST is an international platform for investors who buy and sell stocks in Turkey. Operating in the markets under the name of Istanbul Stock Exchange (IMKB) between 1985 and 2012, BIST provides liquidity and resources to the market and also fulfills an important financial function that allows the ownership to be spread to the public.

Determining the most appropriate interest rates simultaneously with market conditions is one of the most important monetary policies. In this study, the effect of the maximum interest rate decisions on deposits taken by the TCMB between January 2010 and February 2022 on the BIST 100 index was examined..

### LITERATURE SURVEY

When the studies on stock exchange interactions are examined in the literature, the relations between exchange rates and stocks are frequently encountered. The findings of these studies can be evaluated in three groups. First, the relationship between the two variables, regardless of whether it is short or long term, has been determined. Among these studies; Dornbush and Fischer (1980), Aggarwal (1981), Frankel, (1983), Hatemi and Irandoust (2002), Ayvaz (2006), Büberkökü (2008), Rahman and Uddin (2008), Ghazali et al ( 2008), Pekkaya and Bayramoğlu (2008), Kutty (2010), Savaş and Can (2011), Berke (2012), Benli (2015), Ceylan and Şahin (2015), Belen and Karamelikli (2016), Kendirli and Çankaya ( 2016 Eyüboğlu and Eyüboğlu (2018) ), Delgado et al. (2018), Tachibana (2018), Durmus et

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al. (2019), Kumar (2019), Kayral (2020), as well as Uğur and Bingöl (2020). Asad, et al. (2022) also compared energy sources and found a relationship between stock values and exchange rates. In the second type of findings; in the studies carried out; While there is a relationship between the exchange rate and stock prices in some countries, the relationship could not be determined in some countries. Some of these studies are; Ajayi et al. (1998), Granger et al. (2000), Nieh and Lee (2001), Dimitrova (2005), Elmas and Esen (2011) and Büberkök (2013). However; Tsai (2012), Caporale, Hunter and Ali (2014), Aydın (2017) found a relationship between stock prices and exchange rates for all the nations they examined in their studies. The studies in the third group that did not find a relationship between stock values and exchange rates are as follows; Bahmani et al. (1992), Zhao (2010), Akbar, Iqbal and Noor (2019), Akdağ and Yıldırım (2019).

Among the studies conducted with stocks in the literature are the effects of foreign portfolio investments on stocks. In addition, another working group on stocks is on how the values of stocks change with the days of the week. Some of these studies are as follows: In his study on the Dow Jones Industrial Index in Fields (1931), he found that stocks rose on Fridays. Lucey (2000) also determined in his study that the days of the week are effective on stocks. There are BIST100 studies on this subject. The conclusion reached in all of the studies is that the returns towards the end of the week are higher than at the beginning of the week.

The link between stock values and interest rates is worth examining in every period, as the effect on the country's economies is so high that it cannot be ignored. Among these studies; Thorbecke (1997) research is also included. In the study, he stated that monetary policy instruments and stocks affect their values. Lobo (2000) concluded that stock values are limitedly affected by changes in interest rates. Rigobon and Sack (2004) determined that US stock values are affected by the increase in interest rates. Bernanke and Kuttner (2004) observed in their study that the 25 basis point Federal Reserve (FED) rate cut caused an increase in the stock market. Hayford & Malliaris (2008) concluded in their study that increases or decreases in interest rates have no effect on indices in the USA. However, Kashefi (2008) stated in his study that a decrease in interest rates causes an increase in stock prices. In the same period, Grauwe (2008) determined in his study that interest rates have an effect on stock prices. Ehrmann and Fratzcher (2009) determined that the value of stocks in the USA decreased as a result of the increase in interest rates. Duran et al. (2010). Şahin (2011) determined that monetary policy decisions have an effect on the ISE100 index in his study covering the years 2005 and 2010. Lee & Chang (2011) examined the effects of interest rate changes on the Taiwanese stock market and concluded that rates affect stock values. Bleich et al. (2013) tested the relationship between price and stock market in the context of England, America, Japan and Europe and emphasized that interest rate cuts cause fluctuations in stock values. Zare et al. (2013) analyzed the effects of rising interest rates in Asian (Indonesia, Malaysia, Philippines, Singapore, and Thailand) stock markets. As a result, they stated the effectiveness of the effect in the markets. Michlian (2014) could not find that there is a significant relationship between interest rates, one of the monetary policy instruments, and stocks in the Czech Republic. Godollo & Pecs (2018) examined 67 studies on interest rates and stocks between 2010 and 2017. In their study, Köylü and Yücel (2019) determined that the interest rate hike and/or cut decisions taken by the FED had an effect on the BIST100 index in the weekly time frame. Senola (2021) found a negative volatility relationship between the BIST100 index and the interest rate. Wang & Li, (2020) determined the negative relationship between stock returns and long/short-term interest rates in the Chinese stock market.

## METHODOLOGY AND DATA

### Linear Regression and Correlation

Linear regression (LR) is an algorithm that can model the linear relationship between two variables. LR models, which can produce very good relationship models for linear data, are also used for the estimation of linear data. Basically, an LR model is based on the assumption that there is a linear relationship between the input (independent) variables (x) and the output (dependent) variable (y). Hence, it consists of a linear combination of the x and y variables. The simplest regression equation is given by the formula  $y = \beta_0 + \beta_1 x$ ; where  $\beta_0$  is the real constant and  $\beta_1$  is the regression coefficient of the independent variable x. The  $\beta_1$  coefficient is used to determine the effect power of the independent variable on the dependent variable (Olmschenk et al. 2019). In addition, the (+/-) coefficient of  $\beta_1$  gives information about the direction of the relationship between the variables. A negative coefficient means that there is an inversely proportional relationship (Chantana et al. 2019).

### DATA

The data used in this study was created by combining two data sets. The first dataset includes the monthly average closing values of the BIST100 index for the years 2012-2022. The first dataset was taken from investing.com, a financial analysis and news website. The second dataset contains the maximum interest rates charged to deposits by banks. The second dataset covers the years 2012-2022 and is taken from the TCMB Electronic Data Distribution System (EVDS). BIST100\_MM\_KAPANIŞ variable gives monthly average closing values of BIST100 index. The variable TP\_TRY\_MT04\_S gives the maximum interest rates (%) actually applied to Turkish Lira deposits by banks. The D\_BIST100% variable gives the rate of change (%) of the consecutive (monthly) values in the

BIST100\_MM\_OFF variable compared to the previous month. The TP\_MT04\_EXP\_D\_BIST100% variable consists of the values produced by an exponential function where the TP\_TRY\_MT04\_S variable is the base and the D\_BIST100% variable is the power. It is included in Equation (1).

x: TP\_TRY\_MT04\_S,

y: D\_BIST100%,

z: TP\_MT04\_EXP\_D\_BIST100%

k: BIST100\_MM\_KAPANIŞ şeklinde tanımlansın. Buna göre,

Equation (1):  $z=x^y$  (1)

Descriptive statistics of the variables are given in Table 1.

**Table 1:** Descriptive Statistics

Variable	N	Ort. Mean	Medyan	Min.	Maks.	Var.	Std. Dev	Distortion
x	122	16,11	14	9,75	32	26,28	5,12	1,24
k	122	956,78	884,15	535,12	2007,57	82660,3	288	1,53
z	122	1,05	1,0388	0,6208	1,726	0,03	0,17	0,94
y	122	0,01	0,0147	-0,192	0,174	0	0,06	-0,19

There are 122 rows in the dataset, each row corresponding to a monthly average of data. Considering the skewness rates, it is seen that the TP\_TRY\_MT04\_S and BIST100\_MM\_CLOSED variables have a high skewness, while the TP\_MT04\_EXP\_D\_BIST100% variable has a normal level of skewness. Also, the D\_BIST100% variable has a symmetrical distribution. In skewed data, the tail region of the distribution can act as an outlier. This situation negatively affects the performance of the model, especially the models based on regression. A logarithmic transformation will approximate a highly skewed distribution to a symmetrical distribution. The variable TP\_MT04\_EXP\_D\_BIST100% produced based on the exponential function has been added to the data for this purpose. This variable, which will be used as a parameter of the linear regression model to be created, will be reduced to the non-exponential function plane with the logarithmic transformation to be applied afterwards.

## EMPIRICAL FINDINGS

A strong or high correlation means that there is a strong relationship between two or more variables. Table 2 shows the correlation values between the variables.

**Table 2:** Correlation values between variables

Variabl	k	z	y
x	0,52	0,09	0,06
k		0,28	0,22
z			0,98

Correlation values written in red (at  $\alpha=0.05$  confidence level) are correlations that were found to be statistically significant according to the correlation analysis. The results show that there is a statistically significant but not very strong correlation of 52% between TP\_TRY\_MT04\_S and BIST100\_MM\_CLOSED. On the other hand, there is a statistically significant and strong correlation of 98% between TP\_MT04\_EXP\_D\_BIST100% and D\_BIST100%. These results mean that a linear model based on these two variables will have high accuracy. Accordingly, a linear regression model was established with D\_BIST100% as the dependent variable and TP\_MT04\_EXP\_D\_BIST100% as the only independent variable. The Univariate Significance Test, effect sizes and D\_BIST100 % force magnitude results of the model are given in Table 3.

**Table 3:** Univariate Significance Test

Etki	SS	df	MS	F	p-değer	Partial eta-squar.	NCP	Obs. power (0,05)
Beginning	0,3	1	0,3	2132	0	0,95	2132	1
z	0,4	1	0,4	2350	0	0,95	2350	1
Error	0	120	0					

The effect rate of TP\_MT04\_EXP\_BIST100% on the model (partial eta-squared ( $\eta^2$ )=0.95) is 95%. When the p-value is analyzed ( $\alpha < 0.05$ ), this effect ratio is statistically significant in the confidence interval. The non-centrality parameter (NCP) is a measure of the probability of the initial hypothesis being falsified and changes the shape of the F distribution. In other words, it provides a numerical scale on the power and distribution of a statistical model. Accordingly, as the NCP parameter increases, the F-distribution shifts from left to right. In this case, a large percentage of the data is positioned to the right of the critical value with respect to alpha. As a result, it allows a statistically stronger model to be created for the existing data. F-value and NCP have the same magnitude (2350.17).

**Table 4:** Parameter Estimates Of The Regression Model

Effect	y (Param. (β))	y (Std.Err)	y (t)	y (p- value)
<b>Beginning</b>	-0,34	0,007	-46,2	< 0,00
<b>z</b>	0,33	0,006	48,48	< 0,00

The parameter estimates table shows the effect of each independent variable on the model. If the parameter values (β) of the variables are positive, it is concluded that there is a direct proportional relationship between the dependent and independent variable, and an inverse proportional relationship if it is negative. Also, the absolute magnitude of the parameter value gives the effect size of the related variable on the dependent variable. Depending on the parameter estimates given in Table 4; TP\_MT04\_EXP\_BIST100% contributes to the model at a statistically significant level (p value < 0.05). Since the coefficient value is β > 0, it can be concluded that it is directly proportional to the dependent variable (D\_BIST100%).

The R<sup>2</sup> value indicates the variation in the dependent variable explained by the independent variable, or how well the regression model fits the data. The R<sup>2</sup> value is between 0 and 1, and a higher value means a better fit. R<sup>2</sup> value of 0.95 indicates a high level of agreement, and also the p-value (alpha = 0.05 confidence level) reveals that this agreement is statistically significant, as can be seen in Table 5.

**Table 5:** Test of SS Model etc.SS Residual

The dependent variable	Mult(R)	Mult (R <sup>2</sup> )	Adj. (R <sup>2</sup> )	SS	df	MS	SS Res.	df Res.	MS Res.	F-Ver	p-Ver
y	0,98	0,95	0,95	0,36	1	0,36	0,02	120	0,00	2350,2	< 0,00

The following model (2) can be used directly by coding the categorical variables as 0, 1.

$$D\_BIST100\% = - 0,335 + 0,331 * TP\_MT04\_EXP\_BIST100\% \tag{2}$$

Substituting the x, y and z parameters used in equation (1),

$$y = -0,335 + 0,331 \cdot z \tag{3}$$

$$\Rightarrow z = \frac{y + 0,335}{0,331} \tag{4}$$

Accordingly, from equation (1)

$$\Rightarrow x^y = \frac{y + 0,335}{0,331} \tag{5}$$

$$w = \frac{y + 0,335}{0,331} \text{ get it. In this case, } x^y = w. \tag{6}$$

$$\Rightarrow \log_x w = y \tag{7}$$

$$\Rightarrow \frac{\log w}{\log x} = y \tag{8}$$

$$\Rightarrow \frac{\log w}{y} = \log x \tag{9}$$

As a result,

$$\log x = \frac{\log\left(\frac{y + 0,335}{0,331}\right)}{y} \tag{10}$$

equality is achieved. In other words,

$$\log(TP\_TRY\_MT04\_S) = \frac{\log\left(\frac{D\_BIST100\% + 0,335}{0,331}\right)}{D\_BIST100\%} \tag{11}$$

This equation (11), produced based on logarithms, greatly reduced the effect of all outliers on the model.

## CONCLUSION

One of the important problems is to investigate the effects of changes in policy rates on asset prices. The subject that the TCMB's monetary policy decisions are a transfer of MPC to the capital markets in Turkey found support in the study. In this study, the effect of the maximum interest rate decisions actually applied to Turkish Lira deposits determined by the TCMB on the closing values of the BIST100 index is examined. In a study conducted on data covering the years 2012-2022, a very high and statistically significant relationship was found at the level of 95% between these two variables. An exponential composite variable was created by using the existing variables in the data so that the outliers from the nature of the finance data do not affect the result of the study. Based on the correlation analysis, it was determined that the composite variable created had a high correlation with the BIST100 variable. A linear regression model was created in which one of these two variables was assigned as the dependent variable and the other as the independent variable. The fact that the regression model is statistically significant and has an explanatory power of around 95% shows the success of the approach. The produced composite exponential variable is reduced to non-exponential plane by taking its logarithmic transformation in the final model. In this way, a mathematically strong relationship model between the two variables expressed was revealed.

The model obtained in this study is an unsupervised linear model that gives meaningful results on the test data. For this reason, it seems possible to make a comparative evaluation of real assets in the markets by using asset pricing and loan interest rates, which are included in the TCMB money transfer mechanisms, in future studies. In addition, the effects of the decisions taken by the central banks of other developed countries on the stock markets of developing countries can be examined with a similar approach.

## REFERENCES

- Aggarwal, R. (1981). "Exchange Rates And Stock Prices: A Study Of The U.S. Capital Markets Under Floating Exchange Rates". *Akron Business And Economic Review*, (12): 7-12.
- Ajayi, R. A., Friedman, J. & Mehdian, S. M. (1998). "On The Relationship Between Stock Returns And Exchange Rates: Tests Of Granger Causality". *Global Finance Journal*, 9(2), 241- 251.
- Akbar, M., Iqbal, F. & Noor, F. (2019). "Bayesian Analysis Of Dynamic Linkages Among Gold Price, Stock Prices, Exchange Rate And Interest Rate In Pakistan", *Resources Policy*, (62): 154- 164.
- Akdağ, S. & Yıldırım H. (2019). "Dolar Kuru İle Seçilmiş BİST Sektör Endeksleri Arasındaki İlişki: Asimetrik Nedensellik Analizi". *Akademik Hassasiyetler*, 6(12): 409- 425.
- Alkan, U. (2016). *Parasal Aktarım Mekanizması. Para Banka Finans. 7. Bölüm. Orion Yayınevi. Ankara.*
- Asadi, M., Roubaud, D. & Tiwari, A. K. (2022). "Volatility Spillovers Amid Crude Oil, Natural Gas, Coal, Stock, And Currency Markets In The US And China Based On Time And Frequency Domain Connectedness". *Energy Economics*, 105961.
- Aydın, M. (2017). "Gelişmekte Olan Ülkelerde Borsa İle Döviz Kurları Arasındaki İlişki: Simetrik ve Asimetrik Nedensellik Analizi". *İstanbul Üniversitesi İktisat Fakültesi Ekonometri ve İstatistik Dergisi*, (27): 1- 15.
- Bahmani Oskooee, Mohsen & Sohrabian, Ahmad. (1992). "Stock Prices And The Effective Exchange Rate Of The Dollar". *Applied Economics*, (24): 454-464.
- Belen, M. & Karamelikli, H. (2016). "Türkiye'de Hisse Senedi Getirileri İle Döviz Kuru Arasındaki İlişkinin İncelenmesi: ARDL Yaklaşımı". *İstanbul Üniversitesi İşletme Fakültesi Dergisi*, 45(1): 34- 42.
- Benli, Y. K. (2015). "Döviz Kuru İle Borsa İstanbul 100 Ve Sektör Endeksleri Arasındaki İlişkinin Amprik Analizi". *Uluslararası Hakemli Beşeri ve Akademik Bilimler Dergisi*, (4): 55- 72.
- Berke, B. (2012). "Döviz Kuru Ve İmkb100 Endeksi İlişkisi: Yeni Bir Test". *Maliye Dergisi*, (163): 243-257.
- Bernanke, Ben S. & Kuttner, K. N. (2004). "What Explains The Stock Market's Reaction To Federal Reserve Policy?" *Journal Of Finance*. 3 (60): 1221-1257.
- Bleich, D., Fendel, R. & Rülke, C.J. (2013). "Monetary Policy And Stock Market Volatility". *Deutsche Bundesbank Discussion Paper Series, No:45/2013*, 33(3): 1669-1680.
- Büberkökü, Ö. (2008). "Hisse Senedi Fiyatları İle Döviz Kurları Arasındaki İlişkinin İncelenmesi: Gelişmiş Ve Gelişmekte Olan Ülkelerden Kanıtlar". *İMKB Dergisi. Sayı:(52): 1-18.*
- Büberkökü, Ö. (2013). "Hisse Senedi Fiyatları İle Döviz Kurları Arasındaki İlişkinin İncelenmesi: Gelişmiş Ve Gelişmekte Olan Ülkelerden Kanıtlar". *İMKB Dergisi*, 13(52): 1- 18.

- Chantana, J., Kawano, Y., Kamei, A. & Minemoto, T. (2019). "Description Of Degradation Of Output Performance For Photovoltaic Modules By Multiple Regression Analysis" Based On Environmental Factors. (179): 1063–1070. <https://doi.org/10.1016/J.IJLEO.2018.11.040>
- Caporale, G. M., Hunter, J. & Ali, F. M. (2014). "On The Linkages Between Stock Prices And Exchange Rates: Evidence From The Banking Crisis Of 2007- 2010". *International Review Of Financial Analysis*, 33, 87-103.
- Ceylan, S. & Şahin, B. Y. (2015). "Hisse Senedi Fiyatları ve Döviz Kuru İlişkisi". *The Journal Of Academic Social Science Studies*, (37): 399- 408.
- Cook, T. & Hahn, T. (1989). "The Effect Of Changes In The Federal Funds Rate Target On Market Interest Rates In The 1970s". *Journal Of Monetary Economics*, 24, (3): 331-351.
- Delgado, N. A. B., Delgado, E. B. & Saucedo, E. (2018). "The Relationship Between Oil Prices, The Stock Market And The Exchange Rate: Evidence From Mexico". *North American Journal Of Economics And Finance*, 45, 266-275.
- Dimitrova, D. (2005). "The Relationship Between Exchange Rates And Stock Prices: Studied In A Multivariate Model". *Political Economy*, 14(1): 3-9.
- Dornbusch, R. & Fischer, S. (1980), "Exchange Rates And Current Account". *American Economic Review*, 70, Pp. 960-971.
- Durmuş, S., Yılmaz, T. & Şahin, D. (2019). "Makroekonomik Göstergelerin Endeks Getirileri Üzerindeki Etkisi: BİST Örneği". *Avrasya Uluslararası Araştırmalar Dergisi*, 7(16): 870- 886.
- Duran, M., Özlü, P. & Ünalı, D. (2010). "TCMB Faiz Kararlarının Piyasa Faizleri Ve Hisse Senedi Piyasaları Üzerine Etkisi". *Türkiye Cumhuriyet Merkez Bankası Ekonomi Notları*, Sayı: 8, 23-32.
- Ehrmann, M. & Fratzcher, M. (2009). "Taking Stock: Monetary Policy Transmission To Equity Markets". *Journal Of Money, Credit And Banking*. 4 (36): 719-737.
- Elmas, B. & Esen, Ö. (2011). "Hisse Senedi Fiyatları İle Döviz Kuru Arasındaki Dinamik İlişkinin Belirlenmesi; Farklı Ülke Piyasaları İçin Bir Araştırma". *Muhasebe Ve Finansman Dergisi*, 153- 170.
- Eyüboğlu, S. & Eyüboğlu, K. (2018). 'Borsa İstanbul Sektör Endeksleri İle Döviz Kurları Arasındaki İlişkilerin İncelenmesi: ARDL Modeli'. *Ömer Halis Demir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 11(1):, 8-28.
- Fields, M. J. (1931). 'Stockprices: A Problem In Verification', *The Journal Of Business Of The University Of Chicago*, Vol. 4, 415-418.
- Frankel, J. A. (1983), *Monetary And Portfolio Balance Model Of Exchange Rate Determination In Economic Interdependence And Flexible Exchange Rates*, JS Bhandari And B.H Putnam Eds. MIT Press. Cambridge.
- Granger, C. J., Huang, B. N. & Yang, C. Y. (2000). 'A Bivariate Causality Between Stock Prices And Exchange Rates: Evidence From Recent Asian Flue'. *The Quarterly Review Of Economics And Finance*, 40, 337- 354.
- Grauwe, P.D. (2008). *Stock Prices And Monetary Policy*. CEPS Working Document. No: 304. 1-22.
- Godollo, H. & Pécs, H. (2018). "Literature Review And Classification: Monetary Policy And Equity Market Volatility". *Journal Of Financial Studies & Research* Vol. 2018 Article, Pp.1-18. DOI: 10.5171/2018.862384
- Ghazali, M. F., Ismail, W., Yasa, M. R. & Lajuni, N. (2008). "Bivariate Causality Between Exchange Rates & Stock Prices In Malaysia". *The International Journal Of Business & Finance Research*, 2(1): 53- 59.
- Hatemi- J, A. And Irandoust, M. (2002). "On The Causality Between Exchange Rates And Stock Prices: A Note", *Bulletin Of Economic Research*, 54(2), 197- 203.
- Hayford, March D. & Malliaris, Anastasios G. (2008). "Monetary Policy And The U.S. Stock Market". *Economic Inquiry*. 3 (42): 387-401.
- Kashefi, Javad. (2008). "The Effect Of Changes In The Federal Funds Rate On Value And Growth Stock Prices: A Threshold Garch Approach". *International Research Journal Of Finance And Economics* 17. 129-143.
- Kayral, İ. E. (2020). "BİST Şehir Endeksleri İle Döviz Kurları Arasındaki İlişkinin İncelenmesi: Bir ARDL Sınır Testi Uygulaması". *IBAD Sosyal Bilimler Dergisi*, 6, 272- 284.
- Kendirli, S. & Çankaya, M. (2016). "Dolar Kurunun Borsa İstanbul- 30 Endeksi Üzerindeki Etkisi Ve Aralarındaki Nedensellik İlişkisinin İncelenmesi". *CBÜ Sosyal Bilimler Dergisi*, 142 (2): 307- 324.

- Köylü, K. M. & Yücel, A. (2019). "Determination of The Relationship between The Federal Reserve Board Interest Rates and BIST 100 Index" *Muhasebe Ve Finansman Dergisi*. (84): 165-176.
- Kumar, S. (2019). "Asymmetric Impact Of Oil Prices On Exchange Rate & Stock Prices". *The Quarterly Review Of Economics & Finance*, 72, 41- 51.
- Kutty, G. (2010). "The Relationship Between Exchange Rates & Stock Prices: The Case Of Mexico". *North American Journal Of Finance & Banking Research*, 4(4): 1- 12.
- Lee, C. W. & Chang, M J. (2011). "Announcement Effects And Asymmetric Volatility In Industry Stock Returns: Evidence From Taiwan". *Emerging Markets Finance & Trade* 47 (2): Pp.48-61.
- Lobo Bento J. (2000). "Asymmetric Effects Of Interest Rate Changes On Stock Prices. *The Financial Review, Eastern Finance Association* 35: 125-144.
- Lucey, M. Brian. (2000). "Anomalous Daily Seasonality In Ireland?" *Applied Economics Letters*, Vol. 7, Issue 10, 2000. 637-640.
- Michlian, Stefan B.(2014). "The Impact Of Short-Term Interest Rate On Stock Prices In The Czech Republic". *Institute Of Economic Studies Faculty Of Social Sciences Charles University In Prague. Master Thesis*.
- Nieh, C. C., & Lee C. F. (2001). "Dynamic Relationship Between Stock Prices And Exchange Rates For G- 7 Countries". *The Quarterly Review Of Economics And Finance*, 41, 477- 490.
- Olmschenk, G., Zhu, Z., & Tang, H. (2019). "Generalizing Semisupervised Generative Adversarial Networks To Regression Using Feature Contrasting". *Computer Vision And Image Understanding*, 186, 1–12. <https://doi.org/10.1016/J.CVIU.2019.06.004>
- Pekkaya, M. & Bayramoğlu M. F. (2008). "Hisse Senedi Fiyatları İle Döviz Kuru Arasındaki Nedensellik İlişkisi: YTL/ USD, IMKB 100 Ve S& P500 Üzerine Bir Uygulama". *Muhasebe ve Finansman Dergisi*, 163- 176.
- Rahman, L. & Uddin, J. (2008). "Relationship Between Stock Prices And Exchange Rates: Evidence From Bangladesh". *International Journal Of Business And Management*, 3(9): 52- 57.
- Rigobon, R. & Sack, B.. (2003). "Measuring The Response Of Monetary Policy To The Stockmarket". *The Quarterly Journal Of Economics*, 118, Issue 2, 639-669.
- Sato Ilic, M. (2017). "Knowledge-Based Comparable Predicted Values In Regression Analysis". *Procedia Computer Science*, 114, 216–223.
- Savaş, İ. & Can, İ. (2011). "Euro- Dolar Paritesi Ve Reel Döviz Kurunun IMKB 100 Endeksine Etkisi". *Eskişehir Osmangazi Üniversitesi İİBF Dergisi*, 6(1): 323- 339.
- Senol, Z. (2021). "Borsa Endeksi, Döviz Kuru, Faiz Oranları Ve Cds Primleri Arasındaki Oynaklık Yayılımları: Türkiye Örneği. *Business And Economics Research Journal*, 12(1): 111-126.
- Şahin, B.C. (2011). "Para Politikası Kararlarının Hisse Senedi Piyasası Üzerine Etkisi: Türkiye Uygulaması", *Yayınlanmış TCMB Uzmanlık Yeterlilik Tezi*.
- Thorbecke, W. (1997). "On Stock Market Returns And Monetary Policy". *Journal Of Finance*. 5 (67): 981-990.
- Tachibana, M. (2018). "Relationship Between Stock And Currency Markets Conditional On The US Stock Returns: A Vine Copula Approach". *Journal Of Multinational Financial Management*, 46, 75-106.
- Thorbecke, W. (1997)."On Stock Market Returns And Monetary Policy". *The Journal Of Finance*, 52, (2): 635-654.
- Tsai, I. C. (2012). "The Relationship Between Stock Price Index And Exchange Rate In Asian Markets: A Quantile Regression Approach". *Journal Of International Financial Markets, Institutions & Money*, 22, 609- 621.
- Uğur, A. & Bingöl, N. (2020). "Hisse Senedi Ve Döviz Kuru İlişkisinin Yönü: Türkiye Üzerine Bir Araştırma". *Ömer Halisdemir Üniversitesi İktisadi Ve İdari Bilimler Fakültesi Dergisi*. 13(4) Ss: 624-636
- Zare, R., Azali M. & Habibullah. M.S. (2013). "Monetary Policy And Stock Market Volatility In The ASEAN5: Asymmetries Over Bull And Bear Markets". *Procedia Economics And Finance, Sciencedirect* 7,18-27.
- Wang, R. & Li, L. (2020). "Dynamic Relationship Between The Stock Market And Macroeconomy In China (1995–2018): New Evidence From The Continuous Wavelet Analysis". *Economic Research-Ekonomska İstraživanja*, 33(1): 521-539.