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The factors affecting the interest rates: The example of fragile five countries

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ABSTRACT

This study aims to investigate the effects of USD Dollar exchange rates (hereafter exchange rates), stock prices, gold prices, and crude oil prices, which are considered to be in financial and macroeconomic interaction, on interest rates. The interaction between the variables with fixed and random effect panel logit models was estimated and then analyzed. The analysis covers Brazil, India, Indonesia, Turkey, and South Africa, which are called as "The Fragile Five" for the 2016-2020 period. According to empirical evidence of the study, it was found that stock prices, gold prices, and crude oil prices are remarkably associated with the interest rates of the Fragile Five. More specifically, in both predicted models, it is revealed that the stock prices and gold prices have a negative impact on the interest rates, while oil prices and exchange rates have a positive impact.

Faiz oranlarını etkileyen faktörler: Kırılgan beşli ülkeler örneği

ÖZ

Bu çalışmanın amacı, finansal ve makroekonomik açıdan etkileşim içinde olduğu tahmin edilen döviz kuru, borsa endeksi, altın ve ham petrol verilerinin faiz oranlarına olan etkilerini araştırmaktır. Söz konusu amaca ulaşabilmek için sabit ve rassal etkili panel logit modelleri ile değişkenler arasındaki etkileşim tahmin edilerek

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Anahtar Kelimeler:
Panel nitel tercih modelleri, Kırılgan beşli ülkeler, Faiz oranlarının finansal belirleyicileri, Faiz oranı.

incelenmiştir. Analiz 2016-2020 dönemi aylık verileri kullanılarak kırılgan beşli olarak ifade edilen Brezilya, Hindistan, Endonezya, Türkiye ve Güney Afrika ülkelerini kapsamaktadır. Çalışmanın ampirik kanıtlarına göre Türkiye ve analiz edilen diğer ülkelerde borsa endeksi, altın ve ham petrol fiyatlarının faiz oranları üzerinde önemli bir etken olduğu bulgusuna ulaşılmıştır. Ayrıca tahmin edilen her iki modelde de, borsa endeksi ve altın fiyatlarının faiz oranı üzerinde negatif etkisi olduğu görülürken, petrol fiyatları ve dolar kurunun pozitif etkiye sahip olduğu tespit edilmiştir.

1. Introduction

The relationship between financial markets and macroeconomic factors is among the topics researched for a long time. A large body of literature reveals that various financial and macroeconomic factors such as stock prices, exchange rates, inflation rates, interest rates, gold prices, and crude oil prices always affect each other. For instance, an increase in the exchange rate may lead investors to utilize their savings in foreign currency-indexed financial assets. Similarly, a high-interest rate paves the way for savings to remain in assets with high-interest returns. This phenomenon profoundly affects capital markets. In addition to this complex interaction, due to the macroeconomic instabilities stemming from socio-political and economic incidents, the emerging countries seem to have difficulties developing robust financial markets and, accordingly, financial assets. Therefore, it is important to shed more light on emerging countries' financial markets to better understand these countries' contextual characteristics. Brazil, India, Indonesia, Turkey, and South Africa, which was defined as "The Fragile Five" in a Morgan Stanley report published in August 2013, have been the countries that have devalued most against the US dollar after the US FED's decision to tighten monetary policy in 2013.On the other hand, since 2013, when the FED signaled that it would reduce the purchase of bonds, the fastest growing countries for government bond yields have been Turkey, Indonesia and Brazil, respectively, while the increase in those of India and South Africa has been relatively at lower levels. These countries are also characterized by a higher current deficit, higher inflation rates, bad-performing budget balances, and increasing foreign debt burden (Hayaloğlu, 2015, p.131). As a result of the monetary tightening in the markets of the countries in this group, a high amount of capital outflowed and hot money directing into the markets decreased significantly. In these countries that heavily rely on foreign financing, economic growth and development-related risks and vulnerabilities increased accordingly. In other words, the current account deficit has been the most important factor that puts the Fragile five countries in a difficult position in macroeconomic terms.

In financial markets, where financial products are increasingly diversified, gold, which is called a "safe haven", especially in times of crisis, is among the financial assets that have not lost their importance since the earliest times of human history (Dee et al., 2013, p.13).

Another financial asset that attracts investors in financial markets is oil. Changes in the price of two precious mines, such as oil and gold, can significantly affect developing countries' interest rates. Similarly, several studies investigated the relationship between exchange rates and stock prices, and interest rates and found that these factors are positively associated with each other.

This study further examines the factors affecting interest rates, focusing on the Five Fragile countries, employing a panel data approach. The remainder of this paper is structured as follows. In the second section, the literature was reviewed, and then the method and data set were explained in the third section. In the fourth section, the findings were provided and finally the results were discussed in the last section of the paper.

2. Literature

It is possible to find many studies in the literature that examine the relationship between macroeconomic and financial factors. Some of these studies are summarised as follows.

In her model investigating the relationship between the U.S. Dollar, interest rates, inflation rates, silver prices, oil prices, and stock prices, Koutsoyiannis (1983) used daily data between 29th December 1979-31st March 1981. According to the analysis results, she found that gold prices have a positive relationship with the inflation rates, oil prices, silver prices, and have a negative relationship with the US dollar, interest rates, and Dow Jones index. Ghosh et al. (2002) researched the relationship between the US inflation rates, the world inflation rates, foreign currencies exchange rates, and interest rates in their study, using monthly data between January 1976 – December 1999. As a result of the study, they found that gold prices are affected by the U.S. inflation rates, foreign currencies exchange rates, and interest rates.

Vural (2003) employed a multivariate regression model using monthly data between 1990 and 2003 and found that gold prices are positively related to silver, oil, and copper prices while it is negatively related to interest rates, USD / Euro parity, and Dow Jones industrial production index.

Soytaş et al. (2009) analyzed the relationship between oil and gold prices and macroeconomic factors for Turkey between May 2003 and March 2007, using the VAR method. According to the study results, they found no evidence for a significant relationship between oil prices and the macroeconomic factors included in the analysis. In their study, Doğrul and Soytaş (2010) found no causal relationship between interest rates and oil prices in Turkey. They further revealed that interest rates also show a positive directional reaction in case of a positive shock in oil prices. Büyükşalvarcı (2010) analyzed the relationship between the stock market prices, oil prices, interest rates, exchange rates, gold prices and industrial production indexes for Turkey using monthly data between January 2003 - March 2010 by using the multiple regression method. According to the study results, it was concluded that gold prices had no effect on the stock market prices, and there was a negative relationship between other variables and BIST100.

Sari et al. (2010) examined the relationship between gold, silver, platinum, palladium, oil prices, and US Dollars / Euro exchange rate, using the Johansen Cointegration test and VAR analysis between January 1999 and October 2007. According to the results of the study, it was found that the long-term equilibrium relationship between the variables was weak, but the variables reacted to shocks in the short term.

Sharma and Mahendru (2010) examined the relationship between stock prices, exchange rates, gold prices, and inflation rates for India between the period 2002 – 2008, using the vector error correction model (VECM). As a result of the study, it was found that there is a significant and essential relationship between exchange rates, gold prices, and stock prices. Tang et al. (2010) obtained the result in their study that an increase in oil prices positively affects interest rates for China. Sayılgan and Süslü (2011), in the context of the developing countries, examined the effect of macroeconomic factors on stock returns between 1999 and 2006, using panel data analysis. As a result, while there was no statistically significant relationship between interest rates, oil prices, money supply, and GDP and stock returns, it was found that there was a meaningful relationship between the exchange rates and stock returns.

Toraman et al. (2011) predicted the MGARCH model with oil prices, interest rates, inflation rates variables, and gold prices in their study with monthly data between June 1992 and March 2010. They found a negative relationship between gold prices and interest rates and found a positive relationship between gold prices and oil prices, according to their study results.

Kuwornu and Victor (2011) investigated the relationship between stock market returns and macroeconomic factors in the Ghana stock market, using monthly data between January 1992 and December 2008, employing OLS and Box-Jenkins time-series analyses. According to the study results, oil prices, interest rates, and exchange rates did not have a significant effect on stock returns.

Şentürk and Akbaş (2010) examined the relationship between exchange rates, interest rates, gold prices, and US Dollar based BIST 100 between January 2000 and May 2011 by using the Granger

causality method. According to the results obtained from the analysis, it was found that there is a bidirectional causal relationship between the exchange rates and BIST100. Besides, a reverse interaction between gold prices and BIST100 was found, while a one-way causal relationship between interest rates to BIST100 was determined. Aktaş and Akdağ (2013) analyzed the relationship between the BIST100 index, crude oil prices, gold prices, interest rates, inflation rates, exchange rates, unemployment rates, and further macroeconomic factors using monthly data 2008 and 2012, using multiple regression and Granger causality methods. According to the study's findings, no significant relationship was found between BIST100 and gold and oil prices.

Wang and Chueh (2013) examined the relationship between gold prices, US Dollar exchange rates, and oil prices by using daily data between January 1989 and December 2007, using cointegrating and Granger causality analysis methods. According to the results obtained from the analysis, it was found that there is a positive relationship between gold and oil prices. Besides, a negative relationship between the interest rates and the exchange rates and gold prices was found in the analysis. Additionally, it was found that interest rates have a positive effect on crude oil prices in the short term.

In the study conducted by Polat (2013), an analysis was carried out using monthly data between January 1988 and March 2013 to determine the factors affecting gold prices. In the study, wherein the independent variables consisted of exchange rates, Dow Jones Index, oil prices, interest rates, silver prices, and inflation rates; the effect of interest rates on gold prices was found to be statistically insignificant in the conclusion of the econometric analysis; however, the effect of inflation was found to be positive and that of the exchange rate was found to be negative.

Balı et al. (2014) examined the relationship between the BIST 100 index and interest rates, inflation rates, industrial production index, GDP, and money supply variables between 2003 and 2013. According to the results of multiple regression model analysis, a negative relationship was found between inflation and interest rates and BIST 100, while a positive relationship was found between GDP and industrial production index and the stock prices.

Öncü et al. (2015) researched the relationship between the BIST100 index, gold prices, and exchange rates for the period 2002 and 2013, using the cointegration test and Granger causality analysis methods. According to the study results, a one-way causal relationship was determined from the exchange rates and gold prices variables to the BIST100 index.

Pradhna et al. (2015) examined the relationship between exchange rates, interest rates, inflation rates, oil prices, and stock market depth of G-20 countries for the period 1961 and 2012, using the panel vector autoregressive method. According to the results of the study, it was found that there is a relationship between stock market depth, oil prices, and other variables included in the analysis in the long term. Gupta and Goyal (2015) analyzed the relationship between India's oil prices and interest rates using the Var model. According to the analysis results, they found that oil prices and interest rates move in the same direction. Basher and Sadorsky (2016) examined the relationship between stock prices, oil, gold, bonds, and VIX prices in 23 developing countries, including Turkey, using daily data between January 2000 and July 2014. In conclusion, a positive leverage effect was found between stock prices and oil prices.

Uyar et al. (2016) examined the effect of BİST TÜM, BİST 100, BİST 30, BİST MALİ, and BİST BANK indices on interest rates for the period January 2005 and January 2015, using Simultaneous Quantitative Regression Analysis. According to the results of the analysis, it was found that the interest rates have a negative and strong effect on the indices.

Doğanalp et al. (2016) carried out a causality analysis with BIST 100 Index, interest rates, crude oil import amounts, and exchange rates using monthly data of the period 1996:1-2015:6 to examine determinants of gold prices in Turkey. According to the study results, it was found that gold prices are affected by exchange rates, interest rates, oil imports, and BIST 100 Index variables. Öget and Şahin (2017) examined the relationship between BIST100 prices, gold prices, and oil prices using daily data between January 1997 - April 2014, utilizing Johansen Cointegration Test and VECM methods. According to the results obtained from the analysis, it was found that there is a long-term relationship

between the variables. However, it was found that there is no long-term equilibrium relationship between gold and crude oil prices and stock prices.

Çulha (2019) examined the relationship between BIST Banka, financial, electricity, communication indices, which are sub-indices of İstanbul Stock Exchange, and interest rates using monthly data between 2010 and 2018 Cointegration and causality analysis and found that interest rates have a negative impact on sub-sector indices.

Yıldırım et al. (2020) examined the relationship between BIST financial returns, inflation rates, and interest rates that are sub-indices of İstanbul Stock Exchange, using the VAR model and Granger causality analysis for the period January 2013 and March 2020. As a result of the study, it was found that there is a one-way Granger causality relationship from interest rates to BIST financial index.

3. Data set and method

In the study, data on stock market indices, exchange rates, interest rates, gold prices, and crude oil (USD) prices variables for the period 08/2016-08/2020 were used for Brazil, India, Indonesia, Turkey, and South Africa. As of 2016, Brazil, India, South Africa and particularly Turkey's currencies were the most depreciating currencies against dollar. High exchange rates might have negative effects on various macroeconomic and financial indicators, particularly on interest rates. When we look at the interest rates in the Fragile Five, Turkey has followed a different path compared to other group countries. In this regard, in this study, for 2016-2020 period, the effect of volatility in the interest rates of the Fragile Five on macroeconomic and financial indicators was examined, incorporating the possible variances among the related countries. The relationship between the interest rates of countries (monthly rate of 1-year bond interest) and the variables included in the analysis was analyzed by estimating heterogeneous panel logit models.

Information about the countries covered by the study and the names of stock market indices, and the exchange rate variables used as a share certificate market indicator are included in Table 1. The data set used in the study was compiled from the Capital Markets Board's websites and the Central Bank of the Republic of Turkey. Data set for variables from Brazil, India, Indonesia, and South Africa included in the study were compiled from the website Investing.com – Stock Market Quotes & Financial News.

Table 1

Variables of Fragile Five Countries

Country	Stock Market Index	Exchange Rate
Turkey	BIST100	USD/TRY
Brazil	BOVESPA	USD/R
India	BSE Sensex	USD/INR
Indonesia	JSX	USD/IDR
South Africa	JTOPI	USD/ZAR

A dependent variable in the examination of economic relations can be created with two options, one of which is to express the occurrence of an event, and the other is the non-occurrence of an event. Panel data analysis is also performed for models that show the qualitative properties of a dependent variable. In these models, usually, the dependent variable is a dummy variable that takes the value 1 in the case of qualitative change and 0 in the case of non-qualitative change. In the estimation of panel data models whose dependent variable is qualitative, the goal is to determine the factors that determine the probability of an event occurring. In qualitative preference models, there is no limitation on the values that the independent variable will receive (Çağlayan Akay, 2018, p. 203).

Within this context, the abbreviations used, the dependent variables, and the independent variables in the model are shown in Table 2.

Table 2

Abbreviations of Variables in the Model

Interest	Dependent Variable	PLFAİZ
Stock prices	Independent Variable	PLBOR
Gold prices	Independent Variable	LALTIN
Oil prices	Independent Variable	PLOIL
Exchange rate of USD Dollar	Independent Variable	PLDOLAR

In order to examine the effect of variables affecting interest rates, a fixed-effect and random-effect panel logit model was estimated for data of Brazil, India, South Africa, Indonesia, and Turkey for the period 08/2016 and 08/2020. Interest rates determined as the dependent variable was created by giving a value of 1 if it has increased compared to the previous year for the country i in year t, and 0 if it has decreased. Similarly, stock market prices, interest rates, and oil prices variables were transformed into qualitative variables, giving a value of 1 if they have increased in year t compared to the previous year for the country i, and 0 if they have decreased. Gold price variable is included in the model as a quantitative variable. In the study, logarithmic forms of variables were used to facilitate the interpretation of the results of predicted models and eliminate heteroscedasticity.

3.1. Fixed effects panel logit model

In studies conducted using panel data, one way to include the changes arising from differences between units, or differences occurring between units and within time, in the model, is to assume that this change leads to change in some or all of the coefficients of the regression modes. Failure to consider heterogeneity can result in inconsistent estimators. In these models, parameters specific to the unit (and unobservable heterogeneity involve in the model. With these models, parameters specific to the unit (and unobservable heterogeneity involve in the model. Probability in heterogeneous panel logit models is address as follows:

$$P_{it} = P(y_{it} = 1) = F(\mu_{\text{i}} + \acute{\beta} x_{it}) \text{ - } P_{it} = \frac{e^{\mu_i + \beta x_{it}}}{\left(1 + e^{\mu_i + \beta x_{it}}\right)} \tag{1}$$

In fixed-effect models, a heterogeneity that cannot be observed with independent variables is allowed to be associated. In fixed-effect panel logit models, unit-specific effects are explained by constant coefficients. It is expressed in the heterogeneous model as

$P_{it} = F(\mu_{\text{i}} + \acute{\beta} x_{it})$ - Herein P_{it} is a non-linear function of linear components of independent variables

Estimates in fixed-effect panel logit models can be made by the most similar method. The most similarity method is based on the maximization of the logarithmic similarity function. Here, the maximization process can usually be performed by Newton-Raphson or Fisher Scoring way. If, according to the method proposed by Andersen (1970), there are minimum sufficient statistics for the unit effect and this statistic is independent of structural parameters, there will be parameter estimators consistent with maximization of the conditional density function.

Conditional similarity function for Logit models is found as follows:

$$P\left(y_i / \sum_{t=1}^{T} y_{it}\right) = \frac{e^{\acute{\beta}\left(\sum_{t=1}^{T} x_{it} y_{it}\right)}}{\sum_{d \epsilon \tilde{B}_i} \acute{\beta}\left(\sum_{t=1}^{T} x_{it} y_{it}\right)} \tag{2}$$

Since there is no adherence to unit effects in the resulting conditional similarity function, the conditional most similarity estimators to be obtained with the help of this function will be consistent (Matyas and Sevestre, 1996; Chamberlain,1984; Hsiao, 1996).

3.2. Random effects panel logit model

Changes occurring in terms of units or units and time are considered as random effects in random-effects models. The conditional probability of occurrence of the event from random effect panel logit models is calculated as

$$P(y_{it} = (1/\mu_i) = F(\mu_i + \acute{\beta} \, x_{it}) \; ve \; P(y_{it} = (1/\mu_i) = \frac{1}{\left(1+e^{-(\mu_i + \acute{\beta} \, x_{it})}\right)} \tag{3}$$

The most widely used estimation method for these models is the maximal marginal relevance method. This method is widely preferred because it allows making coefficient estimates of variables that are both time-varying and constant with time. In addition, this method is one of the preferred methods because it enables the prediction of future values.

The probability of occurrence of the event in random effect logit models is calculated as,

$$P(y_i/x_i) = \int P(y_i/x_i, \mu_i) \, f(\mu_i) d\mu_i \tag{4}$$

$P(y_i/x_i, \mu_i) = \prod_t P(y_i/x_i, \mu_i)$ Here μ_i is the unit effect.

The maximal marginal relevance method is based on maximizing the logarithmic similarity function. Here, the maximization process can be conducted by Newton-Raphson or Fisher Scoring method. In this method, a special parameter is defined for random effects. The basic assumption of the method is that the independent variables are independent.

In fixed effect panel logit models, a z test is performed for the significance of individual coefficients. LR test, which is similar to the F test but whose distribution is chi-square, is used to test the significance of the predictors (Çağlayan, Akay, 2018, p. 215).

4. Empirical findings and evaluations

In fixed-effect panel logit models, z testing is performed for the significance of individual coefficients. In order to test the significance of estimators together, the LR test, which is similar to the F test but whose distribution is chi-square, is used.

Table 3

Results of Fixed-Effects Panel Logit Model

Independent Variables	Coefficient	Standarde rror	Z value	P>|z|	Confidence Range		Marginal effects	Odds Ratio
					Lower Limit	Upper Limit		
PLDOL	.8454366	.2982013	2.84	0.005	.2609727	1.4299	.0018681*	2.328994**
PLBOR	-.5876568	.2983982	-1.97	0.049	-1.172507 0028071	-	-.0012985*	.5556277**
LGOLD	-2.865418	1.354392	-2.12	0.034	-5.519977 .2108593	-	-.0063316*	.0569593**
PLOIL	.881712	.295732	2.98	0.003	.3020882	1.461336	.0019483*	2.415031**

Note: Prob > χ^2 = 0.0000   LR: 25.82 Log probability: -133.9557 significant according to *5% significance level

According to the fixed effects panel logit model estimate, the coefficients of all variables were statistically significant, according to the 5% significance level. The LR test results in the table conclude that the model is generally significant at 5% significance level. In Logit models, marginal effects of coefficients were calculated because coefficients cannot be interpreted directly. Marginal effects were also found to be statistically significant at the 5% significance level. While the effect of other variables is constant, a one-unit change in the gold prices(LGOLD) variable reduces the

probability of an increase in the interest rate by 0.006; an increase in oil prices(PLOIL) (compared to the fact that it does not increase) increases the probability of an increase in interest by about 0.002. Again, while the effect of other variables is constant, an increase in the dollar(PLDOL) (compared to the fact that it does not increase) increases the probability of an increase in the interest rate variable by about 0.002 units; an increase in the stock market(PLBOR) (compared to the fact that it does not increase) reduces the probability of an increase in interest rates by 0.001 units. Looking at the odds ratios, it is seen that the interest rate increases in these two variables have a significant effect on the interest rate since the odds ratios of dollar and oil variables are greater than 1. Since the odds rates of the stock market and gold price variables are found to be close to 0, it can be said that these two variables are important but have a negative effect on the interest rate variable since the coefficients are significant according to the 5% significance level.

Table 4 shows the random effect logit model's estimated results, in which the interest variable is dependent, and the stock market index, dollar rate, crude oil, and gold prices are independent variables.

Table 4

Results of the Random Effects Logit Model

Independent Variables	Coefficient	Standard error	Z value	P>|z|	Confidence Range		Marginal effects	Odds Raio
					Lower Limit	Upper Limit		
PLDOL	.8361193	.2976304	2.81	0.005	.2527743	1.419464	.1797534*	2.307395*
PLBOR	-.6045153	.2977944	-2.03	0.042	-1.188181 .020849	-	-.1299619*	.5463392*
LGOLD	-2.846946	1.34604	-2.12	0.034	-5.485135 .208757	-	-.6120517*	.0580212*
PLOIL	.8879327	.2960509	3.00	0.003	.3076836	1.468182	.1908925*	2.430101*
Constant	19.62758	9.754654	2.01	0.044	.5088054	38.74634		3.34e+08*

Note: Wald: 22.67* Prob > χ^2 = 0.0000   LR test of rho=0: 1.25 Prob >= chibar2 = 0.10

When we examine the random-effects model, all variable coefficients are statistically significant at the 5% significance level. According to the Wald test statistics, the main hypothesis that all coefficients are zero at the same time is rejected. Thus, the model is generally significant. In logit models, since the coefficients cannot be interpreted directly, the marginal effects of the coefficients are calculated. Marginal effects were also found to be statistically significant at the 5% significance level.

While all other variables are fixed, a one-unit change in gold prices(LGOLD) reduces the probability of the interest variable to increase by 0.612 and the rise in oil prices(PLOIL) (compared to not rising) increases the probability of interest rates to increase by 0.191. Similarly, while the other variables are fixed, the increase in the dollar rate (PLDOL) (compared to not increasing) increases the probability of the interest rates to rise by about 0.180, and the higher the stock market (PLBOR) (compared to a lower rate) decreases the probability of the interest rate to increase by about 0.13. Considering the odds, it is seen that dollar and oil variables have a significant effect on the interest rate since these variables are higher than 1. The stock market and gold variables, on the other hand, can be said to have a significant but negative effect on the interest rate variable, as the coefficients are significant according to the 5% significance level due to the odds ratios being close to 0. Hence, the model is generally significant. According to the last LR test result, it was decided that the random-effects model is more suitable than the pooling logit estimator, according to the 10% significance level.

After determining that the random-effects model estimator is more suitable than the pooling logit estimator, the Hausman test was performed to determine the appropriate fixed effect and random

effect estimators. In the Hausman test, the null hypothesis is established as there is no relationship between the independent variable and heterogeneity, and the alternative hypothesis is that there is a relationship between the independent variable and heterogeneity. Hausman test statistics results are shown in Table 5.

Table 5

Results of Hausman Test Statistics

Independent Variables	Coefficient	Standard Error
PLDOL	.8454366	.8361193
PLBOR	-.5876568	-.6045153
LGOLD	-2.865418	-2.846946
LPETROL	.8817122	.8879327

Note: Prob>chi2: 0.83 Hausman Test Statistics: 0.9350

According to the Hausman test result (0.05<0.935), the main hypothesis stating that there is no relationship between the independent variable and heterogeneity according to the 5% significance level cannot be rejected and it is concluded that the use of the random effect model is more appropriate. Failure to reject the null hypothesis gives the information that, in case both the conditional maximal marginal relevance estimators and the maximal marginal relevance estimators are consistent, both estimators can be used. In addition, if the null hypothesis cannot be rejected, maximal marginal relevance will not be effective.

5. Conclusion

In this study, an econometric model assessing the impact of a number of factors on interest rates in Brazil, India, Indonesia, South Africa, and Turkey-the fragile five counties- for the period 08/2016-08/2020 was estimated by fixed effects and random effects panel logit models. These countries are included in the analysis because they are economically affected similarly by many macroeconomic factors. Especially, they have a higher sensitivity to leading world countries' economic policies.

In the analysis, exchange rates, stock prices, gold prices, and crude oil prices of these countries were included as independent variables. As a result of the investigation, it was determined that the random effect model estimator is more suitable for our case. According to the results of the random effect panel logit model, it was seen that the effect of the stock prices and gold prices on the probability of increasing the interest rate variable is negative, while the dollar and oil prices variables increase the probability of the interest rates to increase.

According to the results of the random effect panel logit model, stock market index and gold prices are negatively associated with the interest rate, while the dollar and oil prices are found to be positively related to the interest rate. The findings of this study are in parallel with the studies of Doğrul and Soytaş (2010) and Toraman et al. (2011) among others. Nevertheless, when compared to Wang and Chueh's (2013) study, this study presents conflicting results.

While there was a negative relationship between the US interest rates and the dollar rate and gold prices in the related study, the relationship between the dollar rate and the interest rate was positive. It is seen that the countries included in our study have a high-risk premium (CDS premium) and actively use the interest rates as a monetary policy tool to finance the current account deficit. Therefore, the reason why there is a similar relationship between the exchange rates and interest rates for these countries can be interpreted as increasing the interest rates in order to increase the decreased foreign exchange reserves when the exchange rates increase. In addition, the results obtained for all variables were similar to other studies in the literature and are in line with the economic expectations.

Based on the findings of the study, it is seen that for the five countries included in the analysis, gold prices and oil prices, stock prices and exchange rates affect the interest rates, and the monetary

policies to be applied in these countries should be evaluated within the framework of this economic reality. In this regard, given the statistically significant results of this study, it would be interesting to perform a comparative study for different emerging countries between recession and growth periods, adding further macroeconomic and financial indicators into model for a longer period of time.

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