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A stochastic process model for sustainable energy markets of advanced economies

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Abstract

This study aims to evaluate the sustainability in energy markets. For this purpose, oil price volatility is considered with respect to the stability in these markets. On the other side, stock market data and inflation rate are taken into account regarding the financial stability and sustainable macroeconomic performance. Additionally, a stochastic process model is proposed by using VAR analysis for G7 countries so that it is intended to examine this relationship for advanced economies. The findings reveal that the increase in oil prices in G7 countries has no significant effect on stock prices and inflation rate. Considering these results, it is determined that volatility in oil prices does not seriously threaten the financial markets and macroeconomic stability of these countries. This situation shows that G7 countries have a stable financial and economic structure. Therefore, it is understood that in a situation where oil prices increase excessively, these countries will not cause serious problems. These results will also guide the financial and macroeconomic policies that G7 countries will implement. For example, while aiming to control inflation in these countries, it would be appropriate to focus on variables other than oil prices. In addition to the issues mentioned, it is understood that factors other than oil price should be taken into consideration while aiming to increase the efficiency of financial markets.

Keywords: Oil Price Fluctuations; Financial Stability; Macroeconomic Sustainability; VAR Analysis

Özet

Bu çalışma, enerji piyasalarındaki sürdürülebilirliğin değerlendirmesini amaçlamaktadır. Bu amaçla, petrol fiyatlarındaki oynaklık, bu piyasalardaki istikrar açısından değerlendirilmektedir. Öte yandan, finansal istikrar ve sürdürülebilir makroekonomik performans açısından borsa verileri ve enflasyon oranı dikkate alınmaktadır. Buna ek olarak, gelişmiş ekonomiler için bu ilişkinin incelenmesi amacıyla G7 ülkeleri için VAR analizi kullanılarak bir stokastik süreç modeli önerilmiştir. Bulgular, G7 ülkelerindeki petrol fiyatlarındaki artışın hisse senedi fiyatları ve enflasyon oranı üzerinde önemli bir etkisinin olmadığını ortaya koymaktadır. Bu sonuçlar dikkate alındığında, petrol fiyatlarındaki oynaklığın bu ülkelerin finansal piyasalarını ve makroekonomik istikrarını ciddi şekilde tehdit etmediği tespit edilmiştir. Bu durum, G7 ülkelerinin istikrarlı bir mali ve ekonomik yapıya sahip olduğunu göstermektedir. Dolayısıyla, petrol fiyatlarının aşırı yükseldiği bir durumda, ilgili hususun bu ülkelerde ciddi sorunlara yol açmayacağı anlaşılmaktadır. Bu sonuçlar aynı zamanda G7 ülkelerinin uygulayacağı mali ve makroekonomik politikalara da yol gösterecektir. Örneğin, bu ülkelerde enflasyonu kontrol altına almayı hedeflerken, petrol fiyatları dışındaki değişkenlere odaklanmaları yerinde olacaktır. Bahsedilen hususların yanı sıra, finansal piyasaların etkinliğinin artırılması hedeflenirken, petrol fiyatı dışındaki faktörlerin de dikkate alınması gerektiği anlaşılmaktadır.

Anahtar Kelimeler: Petrol Fiyatları; Finansal İstikrar; Makroekonomik Sürdürülebilirlik; VAR

1 INTRODUCTION

Energy is a very important factor in meeting the social needs in the country. The main reason for this is that people need energy from many needs in daily life. For example, people get warm thanks to energy and can lighten their homes [1]. In addition to the issues mentioned, energy also plays a very important role in ensuring the economic development of countries. Energy is one of the important raw materials of industrial production. Therefore, energy is needed to continuously increase the production volume in the country. Thanks to the energy provided, the production volume in the country may increase. This will contribute to the growth of the economy [2]. Furthermore, new investments will create new job opportunities. In this way, it will be possible to reduce the unemployment rate in the country.

Energy can be obtained basically in two different ways. One of the most important sources of energy supply is non-renewable energy types. These energies are those obtained from fossil fuels such as oil and natural gas [3]. The cost of these energies is cheaper than other types of energy. However, the most important negative aspect of the energies mentioned is that they pollute the environment due to carbon emissions. On the other hand, renewable energy types are the second source of energy supply. These types of energy are energy types that take their resources from nature like wind and sun. Therefore, it is accepted that the sources of these energies will never be exhausted. The most important advantage of these energy types is the absence of carbon emissions. In this way, it is accepted that renewable energy sources do not pollute the environment [4]. However, the high initial investment costs in these energy projects are the most important obstacle on these investments.

As can be understood from the above points, energy is an indispensable need for a country and should be provided regardless of its price. The important point in this process is whether the country has sufficient energy reserves. If a country has a sufficient amount of energy, it will be easy to supply. However, if there are not enough energy reserves in this country, this country has to bear some costs in energy supply [5]. There are two different alternatives in front of this country. First, this country can meet its own energy needs with renewable energy investments. The problem here is that the initial cost of these investments is high. In addition, a substantial technical infrastructure is required to make these investments. The second alternative in this process is to supply the required energy from outside [6]. In other words, this country can meet this need by purchasing it from another country that has an energy reserve.

Obtaining the needed energy from the outside has a lower cost initially compared to new renewable energy investments. However, this situation has some risks for the country. First of all, the country will become dependent on energy as a result of the outsourcing of energy. This situation will decrease the energy supply security of the country. This energy obtained from abroad is purchased from the foreign unit [7]. So, if foreign currency becomes more valuable, the energy purchased will also become more expensive. This will cause the country's budget balance to deteriorate. In addition, if there is a political problem with the country where the energy is purchased, there is a risk that this energy will not be available or at a higher cost. Finally, the reduction of oil supply worldwide will also make oil more expensive, which will lead to the country that supplies energy from abroad [8].

When these problems are taken into account, it is understood that the external supply of energy poses a threat to the macroeconomic stability of the country. For example, if energy prices rise, the raw material for industrial

production will also increase [9]. Due to these problems, reductions in industrial production will occur. Since this situation will reduce the investments in the country, this situation will lead to the decline in economic growth. In addition to the aforementioned issue, the profitability of companies will also decrease as a result of the decrease in the income in the country. In this case, companies will lay off some of their employees in order to reduce their costs. As a result, the unemployment rate in the country will increase. In other words, the fragility of the country's economy will go up.

On the other hand, as industrial production will become more expensive as a result of the increase in energy prices, the price of products in the market will increase. As a result of the general increase in the prices of the goods in the market, the inflation rate in the country will also increase [10]. Increased inflation will cause uncertainty in the market to increase. Investors, on the other hand, are uneasy in an environment of uncertainty. Therefore, they are reluctant to invest in such an environment. In summary, high inflation will indirectly lead to a decrease in investments in the country. In addition, the interest rate will increase in an environment where inflation is high. Since this situation will increase the cost of investments, this problem will become even bigger.

In this study, the effect of the increase in oil prices on the stock market and inflation was examined. To achieve this goal, Group of Seven (G7) countries are included in the scope of the review. These countries represent the 7 largest economies in the world. Therefore, the problems to be experienced in the financial and macroeconomic systems of these countries can affect the economic system of the world. In the analysis process of this study, the model was established with the help of Vector Auto Regression (VAR) method. This method has several advantages over other similar methods. While other models only look at a one-way relationship, the VAR method takes into account the two-way relationship between variables. Thanks to this situation, it is possible to make a more comprehensive analysis.

The results of this study will guide policy makers. The main reason for this can be understood to what extent oil prices in G7 countries affect financial markets and inflation. Thanks to these results, it will be clearer what kind of policies to control inflation. On the other hand, if there is a relationship between the variables, more explicit strategies can be developed for the financial markets in these countries to be more effective. Analyzing the G7 countries in the study will guide the way to improve the world trade. In addition to the issues mentioned, the use of the VAR method in the analysis process will contribute to achieving more detailed results.

There are four different sections in this study. In the first part of the study, general information about the subject is given. In addition, the second part consists of the literature review. In this section, the variables considered in the study and similar studies for the method used are explained. The third part of the study includes the results of the analysis made with the help of the VAR model. In the last part, there is discussion and conclusion section.

2 LITERATURE REVIEW

Since energy is an indispensable need, this energy need has to be provided regardless of its price. If countries have their own energy reserves, this process can continue more smoothly. However, this requirement is met from other countries since there are not enough energy sources in the country [11]. This situation causes the country to face some risks. For example, when this energy is purchased from abroad, the payment is made in foreign currency. So, if foreign currency is more valuable, the energy purchased will also become more expensive [12]. This overpaid amount will negatively affect the budget balance of the country.

Due to these mentioned negativities, the increase in oil prices is followed by many market experts and academics. It is thought that volatility in these prices may affect many factors in the market [13]. The important point here is that this effect indicated may differ from country to country. For example, in a more fragile market, it can be seen that the increase in oil prices will cause problems in many market factors. However, in a stronger market, this negative impact is considered to be limited [14]. Therefore, it is thought that it would be appropriate that emerging markets should pay more attention to the increase in oil prices.

Volatility in oil prices is thought to reduce the country's macroeconomic stability. In this process, one of the most

important factors is the inflation rate [15]. It is one of the most important raw materials in energy industry production. Therefore, a possible increase in oil prices will increase the costs in industrial production. In this case, the producers will increase their prices due to this cost [16]. Otherwise, the sales prices obtained will be unable to cover the cost of the products. Inflation will occur as a result of the increase in the prices of the majority of the products in a country.

In a country with an inflation rate, investors will be reluctant to make new investments. The main reason for this is that they cannot predict how much the prices will increase. Therefore, they will delay these investment decisions until this problem is resolved [17]. This situation will slow down the country's economic growth. In addition to this mentioned issue, as a result of new investments that cannot be made, the profitability of companies will also decrease. As a result, companies will have to hire workers to lower their costs [18]. This will cause the unemployment rate to increase in the country. As can be seen, the increase in oil prices adversely affects macroeconomic stability, especially in fragile markets.

This has been supported by many studies in literature. Shahrestani and Rafei [19] focused on the oil price shocks on the macroeconomic factors. This analysis is made for Iranian economy. Markov switching vector autoregressive model is used in the examination process. They reached a conclusion that high oil price increase leads to higher inflation rate in the country. This situation threatens the stability of the macroeconomic factors. Also, Al-hajj et al. [20] also examined the effects of increases in oil prices in Malaysia. In this study, unit root and autoregressive distributed lag with structural breaks are considered. According to the analysis results obtained, it was concluded that oil prices cause high inflation and this situation poses a serious threat to the country's economic performance. A similar study was carried out by Nusair [21] for the Gulf countries. Linear and nonlinear ARDL models and panel cointegration models were considered in this study. In this study, it was stated that oil prices had a significant effect on inflation. As a result, it was stated that the increase in oil prices should be paid attention to increase the macroeconomic performance in the country. The idea that volatility in oil prices increases inflation in the country has also been supported by many different researchers in the literature [22-24].

However, some studies in the literature have argued that this argument does not apply to every country. Salisu et al. [25] analyzed the relationship between the increase in oil prices and inflation in their study. For that, dynamic heterogenous panel data models are used in the examination process. It is concluded that this mentioned relationship is not valid for oil exporting countries. Parallel to this study, Bec and De Gaye [26] also studies the impact of oil price on the inflation. In this scope, US, French and UK were evaluated to find this relationship. They stated that in the long run, there is no strong relationship between oil price volatility and inflation rates. On the other side, Choi et al. [27] made a comparative analysis for advanced and developing economies to see if the oil price shocks affect inflation. They reached a conclusion that this relationship is not occurred for advanced countries.

On the other hand, the increase in oil prices may also decrease the efficiency of the financial markets in the country [28]. The excessive increase in oil prices causes problems such as high inflation, threatening the macroeconomic performance of the country [29]. In this case, uneasiness will increase in the country and the financial market investor will not be satisfied with this process. This situation causes portfolio investors to go abroad [30]. As a result, decreases can occur in companies' stocks. It is important that this system operates in a healthy way, as financial markets ensure that the flow of money in the country can be sustained effectively [31].

It is clear that lots of studies supported the view that oil price shocks have an effect on macroeconomic stability and financial market effectiveness. However, some researchers also argued that this relationship is not valid for each type of countries. They indicated that especially for developed economies, oil price has not a strong influence on macroeconomic factors. This situation is mainly occurred for vulnerable economies, such as developing countries. Hence, in this area, new studies should be conducted for different country groups to make a comparative analysis between the results of different evaluations.

3 EVALUATION ON G7 ECONOMIES

In this part of the study, firstly information is given about data set, variable and methodology. After that, VAR analysis results are shared.

3.1 Data Set, Variables and Methodology

In this study, the effects of oil prices on financial development and macroeconomic stability were examined. Within the scope of financial development, the ratio of stock prices to GDP has been taken into consideration. On the other hand, inflation rate was used in relation to macroeconomic stability. Annual data between 1980 and 2018 are used for these variables. The related data has been accessed from World Bank's website. In addition to the issues mentioned, VAR method was used in the analysis process of this study. This method is used to determine the mutual relationship between two or more variables [32,33]. The biggest advantage of this method is that it examines the two-way relationship, not the one-way relationship between variables [34,35]. In this analysis method, effect response graphics and variance decomposition tables can also be accessed [36]. These factors will help to determine the relationship between variables more clearly.

3.2 Analysis Results

In the first stage of the VAR analysis, stationary analysis is conducted. The main reason is that the variables in this analysis should not have unit root. Hence, Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS) panel unit root tests are considered. These unit root tests were preferred in many different studies in the literature [37-42]. The analysis results are given on Table 1.

Table 1. Panel Unit Root Test Results

Variables	LLC Values		IPS Values		Result
	Level Value	First Difference Value	Level Value	First Difference Value	
Oil Price	0.3968	0.0000	0.1497	0.0000	The first difference is used in the analysis.
Stock Values	0.2841	0.0000	0.1297	0.0000	The first difference is used in the analysis.
Inflation	0.0000	-	0.0000	-	It is stationary in the current form.

Table 1 show that the variable of inflation rate is stationary in its current form. On the other hand, the first differences of the variables of oil price and stock values are used in the analysis. The main reason is that the probability values of these variables are higher than 0.05 in their original forms. After that, it is aimed to calculate optimal lag length. In this framework, Akaike (AIC), Schwarz (SC) and Hannan-Quin (HQ) information criteria are accounted. The details of the results are shared on Table 2.

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Table 2. Optimal Lag Length

Lag	AIC	SC	HQ
0	20.88	20.92	20.92
1	19.58	19.76*	19.65
2	19.55	19.85	19.67
3	19.60	20.03	19.77
4	19.40*	19.97	19.63*

In Table 2, it is understood that the optimal lag length is 4. For this purpose, three different information criteria are considered. AIC and HQ indicate that optimal lag is 4 whereas it is 1 for SC. Hence, by considering the majority, VAR model is created with the lag of 4. Since there are 3 different variables in the analysis process, 3 different models were established as a result of the VAR analysis. Details of these models are given in Table 3.

Table 3. Details of the Models

Independent Variables		Model 1 Dependent Variable: Inflation	Model 2 Dependent Variable: Oil Price	Model 3 Dependent Variable: Stock Market (SM)
Inflation (-1)	Coefficient	0.735672	-2.844556	-2.921181
	Standard Error	(0.07357)	(1.00407)	(1.54554)
	t-statistics	[9.99974]	[-2.83301]	[-1.89007]
Inflation (-2)	Coefficient	0.063992	1.806344	0.683050
	Standard Error	(0.09269)	(1.26500)	(1.94718)
	t-statistics	[0.69040]	[1.42794]	[0.35079]
Inflation (-3)	Coefficient	-0.202525	0.088316	1.708924
	Standard Error	(0.08835)	(1.20575)	(1.85598)
	t-statistics	[-2.29241]	[0.07325]	[0.92077]
Inflation (-4)	Coefficient	0.159163	-0.476162	-0.385655
	Standard Error	(0.05595)	(0.76366)	(1.17548)
	t-statistics	[2.84455]	[-0.62353]	[-0.32808]
Oil Price (-1)	Coefficient	-0.005807	0.185758	0.003626
	Standard Error	(0.00527)	(0.07189)	(0.11067)
	t-statistics	[-1.10228]	[2.58375]	[0.03277]
Oil Price (-2)	Coefficient	-0.013001	-0.130526	-0.048998
	Standard Error	(0.00529)	(0.07214)	(0.11104)
	t-statistics	[-2.45969]	[-1.80937]	[-0.44126]
Oil Price (-3)	Coefficient	0.004907	-0.075517	0.086585
	Standard Error	(0.00520)	(0.07103)	(0.10934)
	t-statistics	[0.94282]	[-1.06315]	[0.79191]
Oil Price (-4)	Coefficient	-0.015110	-0.447652	-0.124437
	Standard Error	(0.00571)	(0.07793)	(0.11995)
	t-statistics	[-2.64639]	[-5.74446]	[-1.03739]
Stock Market (-1)	Coefficient	0.004998	0.079896	0.022445
	Standard Error	(0.00312)	(0.04259)	(0.06555)
	t-statistics	[1.60176]	[1.87600]	[0.34238]
Stock Market (-2)	Coefficient	-0.007472	-0.146986	-0.121368
	Standard Error	(0.00314)	(0.04281)	(0.06589)
	t-statistics	[-2.38231]	[-3.43370]	[-1.84194]
Stock Market (-3)	Coefficient	0.002464	-0.004380	-0.093196
	Standard Error	(0.00321)	(0.04386)	(0.06751)
	t-statistics	[0.76668]	[-0.09986]	[-1.38046]
Stock Market (-4)	Coefficient	0.005093	0.109791	-0.220496
	Standard Error	(0.00327)	(0.04460)	(0.06866)
	t-statistics	[1.55829]	[2.46142]	[-3.21148]
Constant	Coefficient	0.464575	5.377291	5.607402
	Standard Error	(0.10842)	(1.47974)	(2.27771)

	t-statistics	[4.28491]	[3.63395]	[2.46185]
R-Squared		0.68	0.23	0.10
Adjusted R-Squared		0.67	0.19	0.05
F statistic		0.00	0.00	0.00

Table 3 explains the details of 3 different models created in the VAR analysis. Additionally, mathematical expressions of these models are given on the equations (1)-(3).

Inflation = C(1,1)*Inflation(-1) + C(1,2)*Inflation(-2) + C(1,3)*Inflation(-3) + C(1,4)*Inflation(-4) + C(1,5)*Oil(-1) + C(1,6)*Oil(-2) + C(1,7)*Oil(-3) + C(1,8)*Oil(-4) + C(1,9)*SM(-1) + C(1,10)*SM(-2) + C(1,11)*SM(-3) + C(1,12)*SM(-4) + C(1,13) (1)

Oil = C(2,1)*Inflation(-1) + C(2,2)*Inflation(-2) + C(2,3)*Inflation(-3) + C(2,4)*Inflation(-4) + C(2,5)*Oil(-1) + C(2,6)*Oil(-2) + C(2,7)*Oil(-3) + C(2,8)*Oil(-4) + C(2,9)*SM(-1) + C(2,10)*SM(-2) + C(2,11)*SM(-3) + C(2,12)*SM(-4) + C(2,13) (2)

SM = C(3,1)*Inflation(-1) + C(3,2)*Inflation(-2) + C(3,3)*Inflation(-3) + C(3,4)*Inflation(-4) + C(3,5)*Oil(-1) + C(3,6)*Oil(-2) + C(3,7)*Oil(-3) + C(3,8)*Oil(-4) + C(3,9)*SM(-1) + C(3,10)*SM(-2) + C(3,11)*SM(-3) + C(3,12)*SM(-4) + C(3,13) (3)

On the other side, the values of the coefficients are also calculated. The details of these factors are given on Table 4-6.

Table 4. The Details of Coefficients for Model 1

Dependent Variable	Independent Variables (IV)	Symbols of IV	Coefficients	Probability Values
Inflation	Inflation (-1)	C(1,1)	0.735672	0.0000
	Inflation (-2)	C(1,2)	0.063992	0.4902
	Inflation (-3)	C(1,3)	-0.202525	0.0222
	Inflation (-4)	C(1,4)	0.159163	0.0046
	Oil Price (-1)	C(1,5)	-0.005807	0.2707
	Oil Price (-2)	C(1,6)	-0.013001	0.0142
	Oil Price (-3)	C(1,7)	0.004907	0.3461
	Oil Price (-4)	C(1,8)	-0.015110	0.0083
	Stock Market (-1)	C(1,9)	0.004998	0.1097
	Stock Market (-2)	C(1,10)	-0.007472	0.0175
	Stock Market (-3)	C(1,11)	0.002464	0.4435
	Stock Market (-4)	C(1,12)	0.005093	0.1196
	Constant Term	C(1,13)	0.464575	0.0000

Table 4 gives information about the model in which inflation is the dependent variable. The first hypothesis in this study is that oil price has an effect on the inflation rate. Therefore, the coefficients of the oil price variable are considered. The probability values of C(1,6) and C(1,8) are smaller than 0.05, so it is clear that these variables are significant. However, the coefficients of them are negative. This means that oil price increase has a decreasing but small effect on the inflation in the future periods.

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Table 5. The Details of Coefficients for Model 2

Dependent Variable	Independent Variables (IV)	Symbols of IV	Coefficients	Probability Values
Oil Price	Inflation (-1)	C(2,1)	-2.844556	0.0047
	Inflation (-2)	C(2,2)	1.806344	0.1538
	Inflation (-3)	C(2,3)	0.088316	0.9416
	Inflation (-4)	C(2,4)	-0.476162	0.5331
	Oil Price (-1)	C(2,5)	0.185758	0.0100
	Oil Price (-2)	C(2,6)	-0.130526	0.0708
	Oil Price (-3)	C(2,7)	-0.075517	0.2881
	Oil Price (-4)	C(2,8)	-0.447652	0.0000
	Stock Market (-1)	C(2,9)	0.079896	0.0611
	Stock Market (-2)	C(2,10)	-0.146986	0.0006
	Stock Market (-3)	C(2,11)	-0.004380	0.9205
	Stock Market (-4)	C(2,12)	0.109791	0.0141
	Constant Term	C(2,13)	5.377291	0.0003

Table 5 explains the situation where dependent variable is the oil price. That is to say, the influencing factors of oil price are considered in this model. This issue is not related to the hypotheses in this study. It is seen that C(2,5), C(2,8) and C(2,12) are significant. It means that oil price increases in the previous periods lead to decrease in this price in current period.

Table 6. The Details of Coefficients for Model 3

Dependent Variable	Independent Variables (IV)	Symbols of IV	Coefficients	Probability Values
Stock Market	Inflation (-1)	C(3,1)	-2.921181	0.0592
	Inflation (-2)	C(3,2)	0.683050	0.7259
	Inflation (-3)	C(3,3)	1.708924	0.3575
	Inflation (-4)	C(3,4)	-0.385655	0.7430
	Oil Price (-1)	C(3,5)	0.003626	0.9739
	Oil Price (-2)	C(3,6)	-0.048998	0.6592
	Oil Price (-3)	C(3,7)	0.086585	0.4287
	Oil Price (-4)	C(3,8)	-0.124437	0.2999
	Stock Market (-1)	C(3,9)	0.022445	0.7322
	Stock Market (-2)	C(3,10)	-0.121368	0.0659
	Stock Market (-3)	C(3,11)	-0.093196	0.1679
	Stock Market (-4)	C(3,12)	-0.220496	0.0014
	Constant Term	C(3,13)	5.607402	0.0141
	Constant Term	C(3,13)	5.607402	0.0141

In the model of Table 6, stock market is the dependent variable. The second hypothesis in this study is that oil price affects stock market. Therefore, the coefficients of C(3,5), C(3,6), C(3,7) and C(3,8) are important for this situation. It is defined that probability values of all these variables are higher than 0.05. It is concluded that oil price does not have important impact on the stock market for G7 economies. In addition, the stationarity of these models is evaluated to see the appropriateness. Figure 1 indicates this situation.

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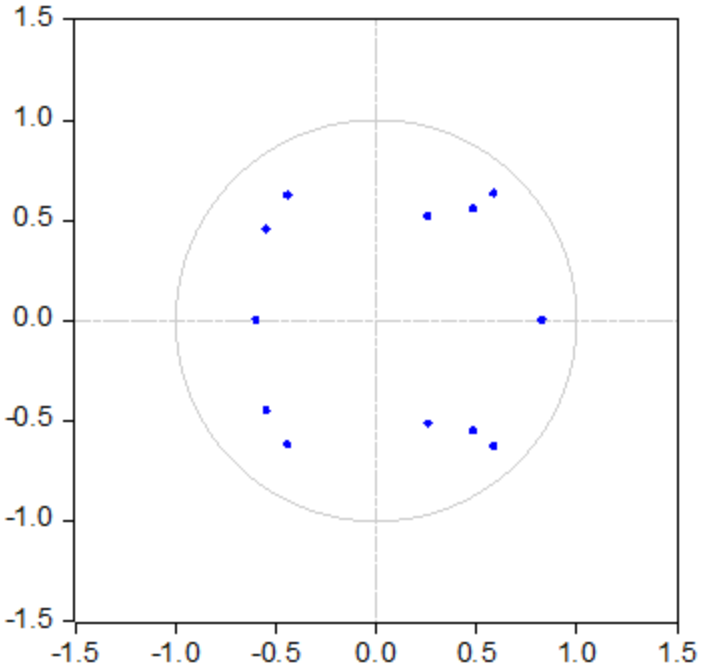

Figure 1. AR Root Graph

Because all points are on the boundary of the circle, it is concluded that the models are appropriate. In the next step, impulse responses are examined. This situation is illustrated on Figure 2.

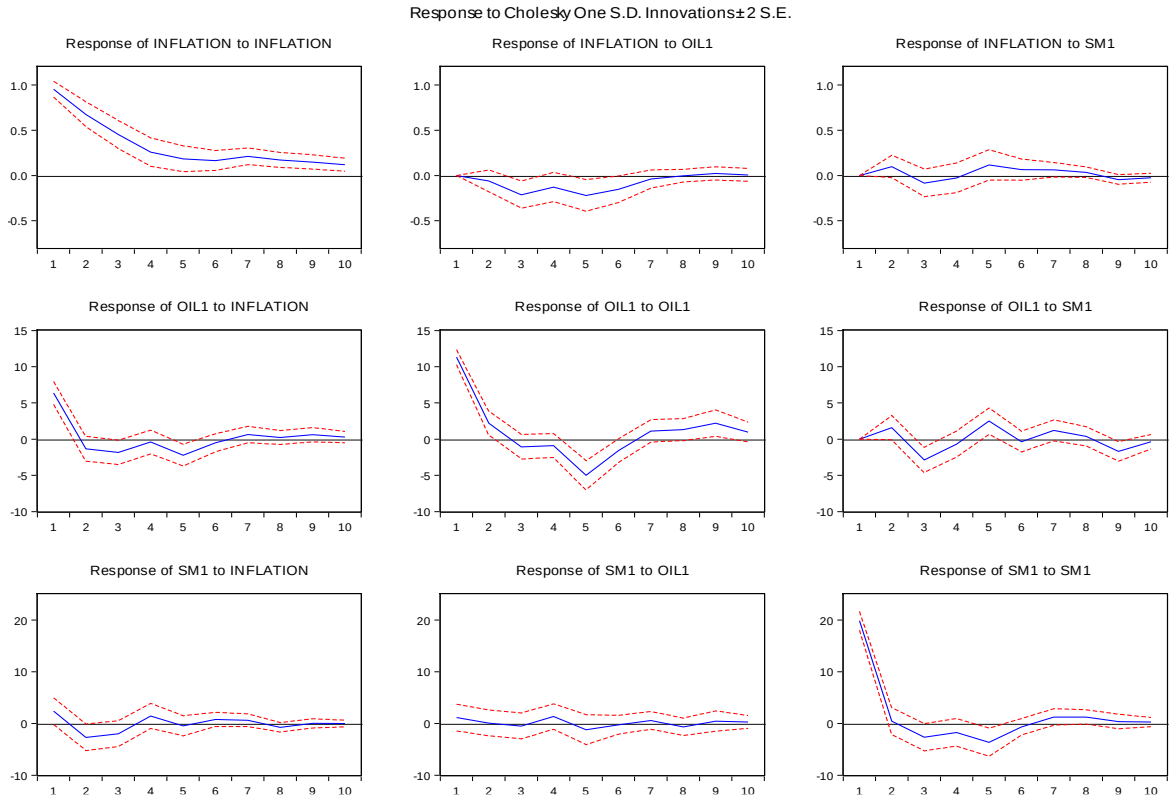

Figure 2. Impulse Responses of Variables

There are 9 different graphs in Figure 2. By considering the hypotheses of the study, the middle graphs on the first and third rows should be evaluated. These figures state that oil price changes do not have any effect on inflation

rate and stock market. Furthermore, variance decomposition tables are created for three different variables. The results are given on Table 7-9.

Table 7: Variance Decomposition Table of Inflation

Period	Standard Error	Inflation	Oil Price	Stock Market
1	0.952504	100.0000	0.000000	0.000000
2	1.173499	99.02279	0.263223	0.713986
3	1.277889	95.99909	2.984391	1.016523
4	1.310134	95.21250	3.781071	1.006430
5	1.346437	92.02490	6.253039	1.722065
6	1.366519	90.81021	7.294888	1.894906
7	1.384819	90.76436	7.183994	2.051642
8	1.395869	90.84376	7.070972	2.085272
9	1.404629	90.83173	7.008301	2.159964
10	1.409895	90.86747	6.958613	2.173917

Table 7 states that inflation is mainly explained by itself. In the other hand, it is seen that oil price volatility does not play a significant role in the explanation of the inflation rate.

Table 8: Variance Decomposition Table of Oil Price

Period	Standard Error	Inflation	Oil Price	Stock Market
1	12.99980	24.01410	75.98590	0.000000
2	13.34581	23.78897	74.80054	1.410498
3	13.81527	23.98274	70.39126	5.626006
4	13.86761	23.88570	70.28087	5.833433
5	15.11125	22.26964	70.10022	7.630136
6	15.20679	22.09905	70.31248	7.588468
7	15.30855	21.97464	69.91163	8.113732
8	15.37067	21.81691	70.07544	8.107651
9	15.63289	21.24203	69.73915	9.018819
10	15.66969	21.17469	69.79531	9.029999

It can be understood from Table 8 that inflation has more impact on oil price by comparing with the stock market.

Table 9: Variance Decomposition Table of Stock Market

Period	Standard Error	Inflation	Oil Price	Stock Market
1	20.01020	1.396259	0.312679	98.29106
2	20.19739	3.165850	0.307984	96.52617
3	20.47760	4.021838	0.360606	95.61756
4	20.64489	4.445898	0.766984	94.78712
5	21.00789	4.344346	1.072327	94.58333
6	21.03404	4.465176	1.087115	94.44771
7	21.08649	4.520958	1.156687	94.32236
8	21.14710	4.623754	1.255587	94.12066
9	21.15476	4.620410	1.299367	94.08022
10	21.15793	4.619407	1.314446	94.06615

Table 9 explains that oil price has a very small effect on the stock market. Consequently, it is understood that in G7 economies, volatility in oil prices does not have an essential influence on financial development and macroeconomic stability.

4 DISCUSSION AND CONCLUSION

This study analyzes the impact of oil prices on financial markets and macroeconomic stability. The mentioned study was carried out for G7 countries. The ratio of stock prices to GDP representing the development in the financial market has been taken into consideration. On the other hand, the inflation rate variable is used in relation to macroeconomic stability. In this study, 3 different models are established for each variable with the help of VAR

analysis. In this process, firstly, the delay length analysis was made. After that, modeler was developed, and coefficient analyzes were made. In addition, it is aimed to reach a detailed result by performing variance decomposition and impulse response analyzes.

As a result, it was determined that the change in oil prices for G7 countries did not have a serious effect on stock prices and inflation. In other words, a possible increase in oil prices does not adversely affect financial markets and macroeconomic stability in these countries. When these issues are taken into consideration, it is seen that the financial and macroeconomic structure in G7 countries is sound. Therefore, volatility in oil prices will not cause great damage to the economies of this country. This situation is a guideline for the managers of this country on behalf of risk management.

The results obtained from this study are guiding the governments of this country in other matters. For example, it will be more accurate to consider variables other than oil prices in policies to be implemented for inflation. In parallel with this mentioned issue, if the financial system is aimed to be developed in these countries or if the issues that affect these markets are analyzed, using variables other than oil prices may yield more meaningful results. Therefore, it is thought that the results obtained from this study can significantly support projects to be carried out on financial and macroeconomic stability in these countries.

In the literature, most of the studies identified that there should be a relationship between oil price volatility and inflation rates. However, in this study, it is concluded that this relationship is not valid for G7 economies. It is obvious that there are also some studies in the literature which supported this view. As an example, Salisu et al. [25] reached a conclusion that this relationship is not valid for oil exporting countries. Similarly, Bec and De Gaye [26] also defined that oil price shocks do not have a strong effect on the inflation in US, French and UK. Moreover, Choi et al. [27] made a comparative analysis for advanced and developing economies and identified that this relationship is not valid for advanced economies.

The biggest constraint in this study is to examine the effect of oil prices on only two variables. Oil prices are an important factor that can affect many different variables. Therefore, new studies can focus on different variables. On the other hand, in this study, the impact of oil prices on financial and macroeconomic stability has been taken into consideration only for G7 countries. The results of the analysis obtained may differ for other country groups. Therefore, it is considered that similar analyzes will be beneficial for E7 countries and energy importing countries.

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