UYGULAMALI SOSYAL BİLİMLER DERGİSİ
2019, Cilt 3, Sayı 1, 41-56.
https://dergipark.gov.tr/iuusbd

Makale Türü: Araştırma Makalesi **e-ISSN: 2602-4543**

CAN GOLD BE CONSIDERED AS A HEDGING INSTRUMENT? AN EMPIRICAL EVIDENCE FROM TURKEY[1]

ALTIN BİR KORUNMA ARACI OLARAK DÜŞÜNÜLEBİLİR Mİ? TÜRKİYE'DEN AMPRİK BİR ÖRNEK

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Makale İşlem Bilgileri
Gönderilme: 17 Aralık 2019
Kabul: 31 Aralık 2019

ÖZ
Altının bir varlık olarak koruma (hedge) enstrümanı olup olmadığı yatırımcılar arasında tartışmalı bir konudur. Türkiye'de altının dolar karşısında, finansal kriz dönemlerinde güvenli bir liman özelliğine sahip olup olmadığı bunun yanında iyi bir riskten korunma, çeşitlendirme aracı olup olmadığı soruları çalışmanın temel noktasını oluşturmaktadır. Bu çalışmanın amacı altını dolar ve hisse sendi piyasası ile ilişkili olmayan bir varlık olarak güvenli bir yatırım aracı özelliğine sahip olma anlamında incelemektir. Bu bağlamda söz konusu inceleme için 2011-01 ile 2017-02 dönemleri arasındaki aylık veriler kullanılmıştır. Bu duruma ek olarak altın ile dolar arasındaki ilişkiyi ortaya koymak adına Augmented Dickey Fuller ve Johansen eşbütünleşme analizlerinden yararlanılmıştır. Sonuç olarak altın ve dolar'ın uzun vadede eşbütünleşik olmadığı sonucuna ulaşılmıştır. Başka bir deyişle, altın dolar karşısında çeşitlendirme aracı olarak kullanılabilir; yani, altın dolar karşısında bir dengeleme aracı olarak düşünülebilir. Bununla birlikte, altın ile İslami fiyat endeksi arasında uzun süren bir ilişki olduğu tespit edilmiştir. Granger Nedensellik analizinin sonucuna gore altının islami endeksler üzerinde etkili olduğu sonucu ortaya çıkmıştır.

Anahtar Kelimeler: *Dengeleme, Koruma, Hedge, Johansen Eşbütünleşme Testi, Granger Nedensellik Analizi*

Article History
Received 17 Dec. 2019
Accepted 31 Dec. 2019

ABSTRACT
Whether gold is a hedge or a safe heaven or not is a controversial discussion among investors. The main point of this study in Turkey against the dollar, gold, whether in times of financial crisis with a safe harbor protection feature is a good addition to the risks it poses to answer the question of whether diversification tool. This paper investigates the feature of gold in terms of a security that is not associated with dollar and Islamic stocks market in Turkey. In this context, we has been used monthly data for the periods between 2011-01 and 2017-02. In addition to this aspect, we have used Augmented Dickey Fuller and Johansen co-integration methodologies in order to investigate hypothesis in Turkey. Thus, it was concluded that gold and dollar are not co-integrated in the long run. In other words, gold can be used as a diversification tool against dollar, implying that gold can be considered as a hedge instrument against dollar. However, there is a long run relationship between gold and Islamic price index. Based on Granger causality method, we have found that gold has an impact on Islamic price index.

Keywords: *Hedge, Johansen Co Integration, Granger Causality Analysis.*

[1] **Makale Künyesi:** Kuzu, S. ve Uysal, M. (2019). Can Gold Be Consıdered As A Hedgıng Instrument? An Empırıcal Evıdence From Turkey. *Uygulamalı Sosyal Bilimler Dergisi*, Cilt, 3, Sayı 1; ss: 41-56.
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INTRODUCTION

Minimum risk and maximum profits are of outmost objectives for investor yet investment decision is surrounded with uncertainty and risk. In order to reach these targets smoothly, the understanding of general economic and political conjunction are irreplaceable topics because the returns of investment instruments are strongly dependent to both of them. Besides, creating optimal portfolio and diversification among investment instrument are also vital topics in terms of constituting optimal investment decision. However, moving in the same direction among assets could be observed because of the effect of globalization so diversifying a portfolio becomes very significant implication for both researchers and investors (Beckmann, Berger, & Czudaj, 2015).

In terms of diversifying a portfolio, a safe haven financial instrument is considered as a useful tool for investors to deal with uncertainty and minimize loses during turmoil. In search of definition, a safe haven (hedge) is a kind of an asset which is moving in the different direction with another asset in turmoil times. There are two types safe haven assets in the economic theory. The first one is the strong safe haven (hedge) one which offers recovery for damages incurred with another asset. Another form is weak form of the hedge which is negatively correlated with another asset return. (Baur & McDermott, 2010) (Baur & Lucey, 2010).

Researchers have conducted many studies in order to obtain a potential safe haven. The reason for these investigations was to identify investment instruments that protect investors against economic turbulence and inflation risk. The primary research of Fisher (1896) identified that expected and unexpected inflation have adverse effect on both the purchasing power of money and the value of assets. Besides, great depression in 1929 was other experience for people because stock market crashed and huge decrease in stock price was observed. Because of all possible pessimistic scenarios, researchers and investors have been in search of finding an asset which helps people to mitigate their losses even in times of economic turmoil. Not surprisingly, gold which is perhaps a coveted object throughout history in every civilization, has been the center of interest in terms of researching a safe haven asset.

Gold is not a popular on international monetary system ever since the collapse of Bretton woods but it is still considered as a unique and leader as a precious metal. Since gold is used as investment assets, as industrial commodity and as well as central banks reserve option, the demand for gold is always high but the supply of gold is stable. Even central banks around world maintain gold as a significant foreign reserve which provides the ability to defend the values domestic currency and stabilize financial system. Indeed, central banks have been pursuit of buying gold because of uncertainty over the monetary system and for diversifying international reserves. By taking into account all mentioned reasons, gold is still an attracting and fascinating asset for investors and for central banks. In this context, many studies have been conducted in order to test the validity of gold as safe haven against inflation (Baur & Lucey, 2010).

However, when the effective role of gold as a safe haven is confirmed by researchers, later studies focused on the relationship between gold and other assets such as bond, stock, oil etc (Srinivasan & Prakasam, 2015) (Koutsoyiannis, 1983) (Fortune, 1988) (Bredin, Conlon, & Potì, 2015). Beyond all these studies, even in the 2007 global financial crisis, since the gold price intensely increased whereas other financial instruments especially stock prices experienced a dramatical decrease, gold is still considered as a safe haven because of unique features.

Since the 2008 financial crisis, Islamic stock instruments have been attracted among investors and researchers because of special characteristics. The intuition of considering Islamic stocks as new safe haven has aroused when the Islamic stock price spectacularly increased or did not decline as much as non Islamic stocks and played a hedging role against inflation du ring the financial crisis. Islamic stocks are suitable and attractive assets for Muslim and Non-Muslim commodities. Islamic stock is must be obey the principles of Shariah discipline on the contrary to other assets; under this rule, ambiguity, gambling and usury are not allowed and Islamic stock markets do not offer financial opportunities to banks. However, since interest is not allowed because of Islamic rules, speculation and balloon in the Islamic stocks are quite limited; as a result, Islamic price index provides stable investment opportunities. There is limited research in the literature, Islamic price index is a lessly investigated topic in terms of being a diversification tool. Besides, relation between Islamic price index and gold raise strong curiosity among researchers. Thus, Islamic price index will be become a more interesting issue in the literature.

Within this scope, monthly data for the periods between 2011 -01 and 2017-02 has been chosen. In addition to this aspect, we have used Augmented Dickey Fuller, Johansen co-integration test, Granger Causality analysis in order to investigate hypothesis. These comprehensive methods are not conducted together in literature so far. Therefore, it can be understood that this study will make a significant contribution to the literature

This paper consists of four different parts. In the second part, similar studies in the literature will be detailed and the missing area in the literature related to this subject will be underlined. Moreover, in the third part, research and methodology will be explained. Within this context, data and methodology used in the analysis will be detailed. After then, analysis results will be shown. Finally, in the last section, analysis results and the recommendations will be discussed.

Whether gold is a safe haven against other assets is an attractive subject among researchers. Therefore, there are lots of studies in the literature which focused on these concepts. Some of these studies were detailed on table 1 and many other studies are also examined properly in the literature review chapter.

LITERATURE REVİEW

In the literature, most of the studies were related to the potential relationship between gold and stock returns. Baur and Lucey (2010) have investigated relation in US, UK and Germany by using GARCH method. They concluded that gold could be a hedge asset against stock market's risk. Hood and Malik

(2013) also have found out a similar conclusion for US. Many studies focusing on different countries and for various periods provided different results. For example, Choudhry, Hassan, & Shabi, (2015) focused on US, the UK and Japan and as a result of nonlinear causality analysis, it was identified that although gold can be used as hedge against stocks in stable financial conditions, it is not able to hedge in financial crisis owing to the bidirectional interdependence. In similar context, Bredin, Conlon, & Potì, (2015) concluded the same conclusion by using Wavelet analysis. Furthermore, Baur and McDermott (2010) defined that gold does not serve as a hedging asset for Australia, Canada, Japan and BRIC countries. However, Gold has important properties as being a shield in financial turmoils. Many studies proved that their evidence supported the property of gold as hedge during the financial crisis (Chan, Treepongkaruna, Brooks, & Gray, 2011) (Miyazaki & Hamori, 2013) (Chen & Lin, 2014) (Emmrich & McGroarty, 2013) (Tuysuz, 2013).

Moreover, there are many studies investigating the potential relationship between interest rates and gold. Koutsoyiannis (1983), Fortune (1987) and Cai, Cheung, Wong (2001) have performed studies in order to find out the trued relation (Cai, Cheung, & Wong, 2001) (Koutsoyiannis, 1983). They have analyzed that interest rates could be considered as one of the main determinants of gold price. According to their studies, interest rates have resulted in a negative price movement in gold price and investors and corporations should observe interest rates which has substantial effects over leverage and mismatch in cash flows. Thus, as a result we can say that interest rates have a strong impact on investment and portfolio strategies.

In addition to those studies, the potential hedge mechanism of gold against currency risk is also a popular topic among most of the researchers. Reboredo (2013a) tried to find out the relation between gold and currency. Within this scope, by using TGARCH and Coppula model, it was identified that gold is able to act as an important safe haven against the fluctuation of US Dollar. By applying DCC-GARCH model, Joy (2011) showed that gold is an effective hedge against currency risk consistent with the US dollar; however, could be a poor safe haven asset. In addition to these studies, Srinivasan and Prakasam (2015) have tried to investigate the relationship between stock index, gold price and foreign exchange rate in India. It was understood that there is long term relation between these assets (Srinivasan & Prakasam, 2015).

While there are many substantial empirical studies regarding the relationship between gold return and other assets returns, gold is also used as shield against inflation. The relationship between gold return and inflation in emerging markets is among the popular topics. Ghazali et. al. (2015) tried to understand whether gold can be used to hedge against inflation in Malaysia. By using OLS analysis, it was identified that there is no important relationship between gold return and inflation; thus, that gold does not provide a protection against inflation in Malaysia. Additionally, Worthington and Pahlavani (2007), Ghosh et. al. (2004) and Barisheff, N. (2006) concluded that gold is an important safe haven (Worthington &

Pahlavani, 2007) (Barisheff, 2006). On the contrary, Billie (1989) and Tully and Lucey (2007) reached an evidence that gold is not hedging instrument against inflation (Tully & Lucey, 2007).

Additionally, Hussin et. al. (2013) focused on raw topic which based on Islamic stock return and gold compared to above mentioned literature. They reached an important conclusion that Islamic share price is not consistent with the crude oil or the gold price in the long term in Malaysia with using VAR model. Similarly, Mensi et. al. (2015) has tried to investigate comprehensive analysis. It was determined that in both normal and crisis times, gold or Islamic stocks can be used to hedge in order to protect investers' portfolio. However, Khan et al. (2005) used GARCH model so as to examine relationship Islamic stocks and various commodity returns. In their study, especially in the 2008 financial crisis, their volatility soared up and they moved together (Khan, Kabir, Bashar, & Masih, 2015).

While considering these studies, it was understood that there are lots of studies in which the question of which commodity assets is safe haven analyzed. Additionally, it was also seen that the investigation on relationship gold and Islamic price index was also taken into the consideration in many different studies. Similarly, many studies expand their studies through adding investment assets. However, it was understood that gold, Islamic price index, dollar and are altogether not a study in Turkey in terms of the literature.

Table 1: Literature Review

Author	Scope	Methodology	Results
(Baur & Lucey, 2010)	U.S., U.K. and German	GARCH and Portfolio Analysis	In terms of extreme stock market conditions, gold is safe haven in the short-term.
(Baur & McDermott, 2010)	Most developed and developing countries	GARCH	It was concluded that gold is regarded as strong safe haven for most developed markets in the recent financial crisis.
(Hood & Malik, 2013)	U.S.	GARCH	It was identified that gold represents as hedge and a weak haven for the US stock market on contrary to other precious metal.
(Reboredo J. C., 2013)	U.S. and Many European Countries	TGARCH	It was evaluated that gold is able to act as an important safe haven against the fluctuation of US Dollar.
(Reboredo J. C., 2013)	U.S.	TGARCH	It was revealed that gold can act as effective safe haven in the fluctuation of oil price.
(Ciner, Gurdgiev, & Lucey, 2013)	U.S. and U.K.	The DDC model	It was confirmed that gold is seen as a safe haven when exchange rates fall.

(Joy, 2011)	US	DCC- GARCH	It was showed that gold become an effective hedge against currency risk.
(Coudert & Raymond, 2011)	G7 Countries	ARMA-GARCH-X model	Gold is able to act as hedge against stock returns since gold and stock returns is concluded negative or null in all cases.
(Beckmann, Berger, & Czudaj, 2015)	Many developed and developing countries	GARCH	It was analyzed that gold can serve as a safe haven against stock returns.
(Gürgün & Ünalmış, 2014)	Emerging Countries	GARCH	They reached a conclusion that gold is represented as a safe haven in more countries when equity markets are vigorously suffered.
(Ghazali, Lean, & Bahari, 2013)	Malaysia	ARDL –GARCH	It is defined that gold is adversely associated with stock on average; that is, gold is a safe haven.
(Bredin, Conlon, & Potì, 2015)	USA, United Kingdom and Germany	Wavelet analysis	It was examined that with regarded to financial crisis, gold is found as a safe haven, but during the economic contractions.
(Reboredo & Castro, 2014)	Developed Countries	POT approach	It was determined that gold has been acted as a weak safe haven against extreme USD movements.
(Ming, Yang, & Li, 2017)	China	Wavelet Analysis	The result is revealed that gold have been scarcely served as hedge against stock market in China after 2005.
(Hoang, Lahiani, & Heller, 2016)	China, France, India, UK and USA	Nonlinear ARDL	The result posed that in the long term, gold is not a safe haven in all countries.
(Hussin, Muhammad, Razak, Tha, & Marwan, 2013)	Malaysia	VAR Model	It was identified that Islamic share price is not associated with either the crude oil price or the gold price in the long term.
(Śmiech & Papież, 2016)	US	EGARCH	It was analyzed that only gold is seen as a weak hedge for equity.
(Iqbal, 2017)	Pakistan, India and US	EGARCH	Study reached a conclusion that gold is not able to hedge against stock market.

(Choudhry, Hassan, & Shabi, 2015)	US, the UK and Japan	Nonlinear Causality Analysis	While gold can be used as hedge against in stable financial condition, it is not a hedge in financial crisis owing to the bidirectional interdependence.
(Capie, Mills, & Wood, 2005)	US, JAPAN and UK	GARCH	It was analyzed that gold has been seen as a safe haven in fluctuations foreign value of the dollar
(Ghazali, Lean, & Bahari, 2015)	Malaysia	Regression	It was concluded that domestic gold is not a hedge against inflation.

In the literature studies conducted with ARCH models and other statistical models, investment tools such as gold, Islamic price index and dollars are considered whether gold can be considered as a hedge instrument. As a result of the study, it has been concluded that gold can be considered as a hedge instrument for investors especially during the volatility times and during the financial crisis.

METHODOLOGY

ADF Unit Root Test

Dickey-Fuller (1979-1981) is one of the methods which is commonly used in order to achieve whether variables is stationary or not (Dickey & Fuller, 1981). In this process, zero hypothesis (H_0:γ=0) refers to the fact that the series have unit root; however, alternative hypothesis indicates that the series have not unit root.

In order to find out if the variables are stationary or not, ADF was used. However, since all of the variables are index, Logarithmic form is required before the process. Details of this method were detailed on the table below.

Tablo 2: Augmented Dickey Fuller Unit Root Result

	Augmented Dickey Fuller Unit Root	
Variables	Level t statistic and p value	First differences- t statistic and p value
Logdollar	t-statistic=-1.997076 p value=0.5930	t-statistic= -8.432731 p value= 0.0000
Loggold	t-statistic=-2.991668 p value= 0.1417	t-statistic= -9.521644 p value= 0.0000

Logislamic	t-statistic=-1.311729 p value= 0.6201	t-statistic=-6.986280 p value= 0.0000

Sources: Authors

In consequence of this test, results were indicated that all of variables are not stationary in their level values. For the first differences, variables are stationary. By virtue of this situation, co integration test will be operated so as to define the relationship between the variables.

Johansen Co-integration Analysis Results

Analyzing on unstationary variables is not confidential and misleading forecasting can be observed. In order to remove these obstacles, various methods are improved. One of the most common solutions is first difference taking but this option generates different problems. In terms of long run equilibrium, much substantial information disappears. Owing to stationary process, possible long run relation between variables is not evaluated. Co-integration method is modeled to remove above mentioned problem and with the help of Johansen co-integration method, long run relation can be identified (Karagöl, Erbaykal, & Ertuğrul, 2007).

Since the variables are stationary in their first differences, co-integration between these variables would be investigated. First of all, lag intervals for the variables is identified. With regard to the variables, optimal lag interval is "1". These lag intervals were obtained using Akaike Information Criteria and Shwartz Criteria. The details of these results were presented as below.

Table 3: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	145.2657	NA	3.06e-06	-4.184286	-4.086367	-4.145488
1	369.2616	421.6393*	5.49e-09*	-10.50769*	-10.11602*	-10.35250*
2	373.9512	8.413594	6.24e-09	-10.38092	-9.695480	-10.10933
3	378.5798	7.895993	7.13e-09	-10.25235	-9.273154	-9.864361
4	387.0111	13.63875	7.30e-09	-10.23562	-8.962667	-9.731237
5	391.5138	6.886563	8.44e-09	-10.10335	-8.536636	-9.482569
6	397.3070	8.349039	9.45e-09	-10.00903	-8.148561	-9.271855

Table 4: Johansen Co-Integration Test Between Gold And Dollar

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.066346	5.095828	15.49471	0.7986
At most 1	0.002123	0.153036	3.841466	0.6956

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5: Johansen Co-Integration Test Between Gold And Islamic Price Index

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.234506	20.17227	15.49471	0.0091
At most 1	0.012853	0.931424	3.841466	0.3345

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

When conducted that the variables had unit root and have the same order of integration, the question of whether all variables are co-integrated or not can be proceeded. To examine, the Johansen Co-integration (1988) test was conducted. While considering Table 4 and Table 5, it can be emphasized that there is no long- term relationship gold and dollar whereas there is long term relationship between gold and Islamic price index. Therefore, an important result is reached that gold market can be good diversification against dollar. Owing to this situation, gold and dollar can be considered as an alternative investment against each other. Simply, gold is hedge against dollar. This result is similar to many studies in the literature (Reboredo J. C., 2013) (Capie, Mills, & Wood, 2005) (Joy, 2011).

Granger (1969) argued that Granger causality is to exist in at least one direction when there is long run relationship between two variables. The details of these results were given below.

Tablo 6: Granger Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.

LOGISLAMIC does not Granger Cause LOGGOLD	73	13.6280	0.0004
LOGGOLD does not Granger Cause LOGISLAMIC		1.22904	0.2714

The results of Granger causality test are indicated in Table 6. When regarding Table 6, null hypothesis is identified that Islamic price index does not Granger cause gold. After achieved p value, it can be understood that null hypothesis is not rejected. Additionally, alternative hypothesis underlines that gold does not Granger cause Islamic price index. After viewed p value, alternative hypothesis is rejected. In other words, gold has impact on Islamic price index.

RESULTS

To find out the true relation between gold returns, Islamic stock returns and dollar returns monthly data of gold, Islamic price index and dollar returns for period between 2001-M01, 2017-M02 was analyzed. Data are obtained from the data providers of "Finnet" and "Bloomberg".

To understand the nature of the relation between these assets and to have unbiased results Johansen co-integration analysis and Granger Causality analysis were conducted in this study. Before these analyses, unit root test is required. Thus, ADF unit root test was used.

Gold's operating mechanism is not influenced by international data flow because it does not depend on any central authority or economy. Especially when it is higher than other emerging openness degrees when we look at countries like Turkey and evaluated on a critical in terms of sudden volatility movements experienced in the economy, gold's news flow affected reveal the situation can not be considered as a hedging instrument in terms of investors in these countries. From this point of view, it is possible to reduce the risks specific to developing countries, and at the point where the current demands are blocked and against the volatility movements that can be experienced, the gold can be considered as an alternative product.

CONCLUSION

In this study, Whether gold is a hedge or a safe heaven or not is tried to analyze in order to create optimal portfolio. In a consequence of this analysis, it was concluded that all variables are not stationary on their level values.

By virtue of this situation, Johansen co-integration analysis will be conducted in order to define the relationship between variables. As a consequence of co-integration analysis, it was found that the co-integration between gold and dollar is not found whereas there is a long run relationship between gold and Islamic price index. It can be understood that gold is safe haven or hedge against dollar. In this study, cointegration and causality analyzes were conducted to determine the effect of dollar and Islamic price index on gold prices. In the study using the data, it was investigated whether there was a long-term

relationship between the series and the existence of a long-term relationship. After long-term relationship with Johansen Cointegration Test, Granger Causality Test was applied in order to determine whether the relationship between them is bi-directional or unidirectional. As a result of Granger Causality Test, it was found that there is a two-way relationship between gold and dollar. In other words, both gold prices and dollar prices had Granger causal effects on each other. A long-term relationship between the gold prices and the Islamic price index was found and it was concluded that there was no causal relationship with the granger. It was thought that this test could reveal the desired situation in the study because it showed successful results in revealing the existence of the relationship between gold, dollar and Islamic price index of Cointegration Test. The fact that two or more time series with variable trends move very close to each other in the long term, ie they have a common trend, shows that these series are co-ordinated. In other words, gold market can be good diversification against dollar and this result is similar to studies in studies based on Turkey. Additionaly, while considering the relationship between gold and Islamic price index, the identification causality between gold and Islamic price index become an important question. Hence, Granger Causality analysis was implemented to these variables. The results identified that gold has impact on Islamic price index. All in all, these results contribute much important information to minimize risk and diversify portfolio.

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