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GOLD MARKET IN TURKEY AND EFFECT OF PANDEMIC ON GOLD

Okan DİKMEN
116620018

Assoc. Prof. Serda Selin ÖZTÜRK

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Gold Market in Turkey and Effect of Pandemic on Gold

Türkiye'de Altın Pazarı ve Pandeminin Altın Üzerindeki Etkisi

Okan DİKMEN

116620018

Tez Danışmanı:	Doç. Dr. Serda Selin Öztürk
	İstanbul Bilgi Üniversitesi
Jüri Üyesi:	Doç. Dr. Ender Demir
	İstanbul Medeniyet Üniversitesi
Jüri Üyesi:	Dr. Öğr. Üyesi Umut Keskin
	İstanbul Bilgi Üniversitesi

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1) Effect of Covid 19 Pandemic
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PREFACE

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ARDL: Autoregressive distributed delay

OBS: Number of observations

STD DEV: Standard deviation

REF: Referances

MAX: Maximum

AVG: Average

MIN: Minimum

PR: Policy interest

Wcovcase: Covid-19 World cases

Tcovcase: Covid-19 Turkey cases

BRSA: The Banking Regulatory and Supervisory Authority

MERS: Middle East respiratory syndrome

LBMA: London Bullion Market Association

TGMA: Turkish Gold Miners Association

AIC: Akaike information Criterion

WHO: World Health Organization

VAT: Value added tax

EWMA: Exponentially weighted moving average

AR: models autoregressive

Arma: Moving average models

GARCH: Autoregressive conditional heteroscedasticity models

ECB: European Central Bank

LIST OF TABLES

ABSTRACT

The Covid-19 epidemic, which can be called the plague of our time today, affects financial markets as deeply as it affects the health sector. Analysis in a study to measure the impact of the Covid-19 pandemic on gold prices, 22.01.2020 - 08.04.2020 was estimated using the ARDL model with daily data. In the study, which examined gold prices as dependent variables, Covid-19 Turkey case number, Covid-19 World Case Number, US dollar ratio, policy interest and fuel prices were included in the analysis as independent variables. Because the selected variables are stable at different levels, the results of short-term and long-term analysis were interpreted within the framework of the ARDL model. Based on the results of the error correction model, the long-term capture rate of the model was estimated at 51 percent. Gold is the most well-known and traditional financial instrument in which we can observe how investors develop financial instruments in situations that lead to global panic. According to the results, there are negative correlation between gold prices and short-term Unites States dollar exchange rate and political interest rate. Also, there are positive correlation between gold prices and fuel prices, Covid-19 World number of cases, Covid-19 Turkey number of cases. According to the results of a long-term relationship Covid-19 has been observed that a co-integrated relationship between gold prices with all variables except for the case of Turkey the number of variables.

Keywords: Covid 19 Pandemic, Gold Prices, ARDL Model, Gold, Gold Market

ÖZET

Günümüzde çağımızın vebası olarak adlandırılabilecek Covid-19 salgını, finansal piyasaları sağlık sektörünü etkilediği kadar derinden etkilemektedir. Covid-19 pandemisinin altın fiyatları üzerindeki etkisini ölçmek için yapılan bir çalışmada analiz, 22.01.2020 ve 08.04.2020 tarihleri arası günlük verilerle ARDL modeli kullanılarak tahmin edilmiştir. Altın fiyatlarını bağımlı değişken olarak analiz eden çalışma da, Covid-19 salgınının Türkiye vaka sayısı, Covid-19 salgınının Dünya vaka sayısı, Amerikan Doları oranı, politika faizi ve akaryakıt fiyatları bağımsız değişken olarak analizde yer verilmiştir. Yukarda bahsedilen değişkenlerin farklı seviyelerde durağan olması nedeniyle, analiz sonuçları kısa vadeli dönem ve uzun vadeli dönem olarak ARDL modeli çerçevesinde yorumlanmıştır. Hata düzeltme modelinin sonuçlarına göre, modelin uzun vadeli dönem yakalama oranı yüzde 51 olarak tahmin edilmiştir. Yatırımcıların finansal araçlara küresel paniğe yol açan durumlarda nasıl bir davranış geliştirdiğini gözlemleyebileceğimiz en bilinen ve geleneksel olan finansal araç altındır. Elde edilen sonuçlara göre altın fiyatları ile kısa vadeli ABD doları kuru ve siyasi faiz oranı arasında negatif korelasyon bulunmaktadır. Ayrıca altın fiyatları ile akaryakıt fiyatları arasında pozitif korelasyon tespit edilmiştir. Covid-19 Dünya vaka sayısı, Covid-19 Türkiye vaka sayısı. Uzun vadeli bir ilişki sonuçlarına göre Covid-19'un değişken sayısı Türkiye dışında tüm değişkenlerle altın fiyatları arasında ortak entegre bir ilişki olduğu görülmüştür.

Anahtar Kelimeler: Covid 19 Pandemi, Altın fiyatları, ARDL modeli, Altın, Altın piyasası

INTRODUCTION

On 31 December 2019, an unknown virus was announced by the World Health Organization (WHO) Chinese authorities from Wuhan, Hubei province, China. In January 2020, the World Health Organization declared Covid-19 as a pandemic. Between December January 31, 2019 and January 3, 2020, a total of 44 cases of this virus were identified. On January 11, the first death from the corona virus was announced. The first cases were seen in Thailand on January 13 and in South Korea on January 20 (who, 2020a). In January, the Chinese government began quarantining places where the outbreak had been seen. On 24 January, the WHO declared the risk level as high globally. On January 30, the WHO declared a public health emergency worldwide. On February 11, the WHO named the new type of virus corona virus Covid-19. On February 28, the WHO raised its risk level from high to very high. After Covid-19 cases exceeded 118,000 in 114 countries and 4,291 people died, on 11 March 2020, the World Health Organization declared Covid-19 as a global pandemic and proposed containment and mitigation measures worldwide (who, 2020b). From March, the outbreak began to be widely seen outside China, especially in Europe and the United States, and Europe became the center of the epidemic. In addition, first Covid-19 cases were reported in March 2020 in Turkey.

According to WHO data, as of June 4, 2020, there were 6,416,828 total cases and 382,867 total deaths worldwide. The number of new cases worldwide on June 4 was 126,350, and the number of new deaths was 5,741. Since April May, the trend of rapid increase in the number of cases has stopped, and in the second and third weeks of May, there is a partial increase, especially with cases seen in Latin America. In contrast, death numbers tend to decrease from mid-April. A decrease in the number of deaths without decreasing the number of cases indicates progress in treatment processes related to COVID-19. As of June 3, 2020, COVID-19 cases are the most common countries and their number is 1,823,220, Brazil 555,383, Russia 441,4108, England 279,860, Spain 240,326, Italy 233,836, India 216,919,

Germany 182,764 and Turkey 166,422, respectively. Deaths from COVID-19 in countries are us 106.051, UK 39.728, Italy 33.601, Brazil 31.199, France 28.964, Spain 27.940, Mexico 10.637, Belgium 9.522 and Germany 8.581, respectively. As of the same date, the total number of deaths in Turkey is 4,609 (who 2020c). Outbreaks similar to Covid-19 have been seen on the global level before, such as SARS, Ebola, MERS. 40 million people died in the Spanish flu seen between 1918 and 1919, 14. about 60 million people are known to have died in an epidemic called the Black Death seen in the century. The plague epidemic, called the Black Death, spread from China to the Mediterranean via merchants traveling along the Silk Road, and from there to Africa and Europe (Fernandes, 2020: 4). The Ebola outbreak, first identified in 1976, has been seen mostly in Sub-Saharan West African countries and Nigeria. Approximately 28,000 cases and 11,000 deaths were identified from the Ebola virus in the period 2013 - 2016 (Edu-Afful, 2018:241). The SARS outbreak, detected in Guangdong province in northern China, has been seen in 26 countries with more than 8,000 cases. MERS was seen in 27 countries between 2012-2020 with 2,521 cases and 866 deaths (who 2020d). Covid - 19 is between 3 and 30 times more deadly than seasonal influenza and ten times more contagious than Sars (Loayza and Pennings, 2020). There are some consequences of past outbreaks (Boissay and Rungcharoenkitkul, 2020: 2): First, the costs of outbreaks vary depending on their severity and how they are tackled. Second, macroeconomic costs can be realized together with the impact of both supply and demand. In order to combat the risk of epidemics, production and consumption are decreasing, economic contraction and unemployment may occur. Third, the negative effects of epidemics on the economy can last a long time. Economic recovery can take time, as the danger of an epidemic does not disappear suddenly. Covid-19, which appeared in early January in Wuhan, China, affected the entire world. While Covid-19 poses threats to human and community health, many consequences, especially economic and Financial, have emerged and continue to emerge due to the virus. As Covid-19 began to be seen outside China, especially in Europe, the world's view of the virus began to change, creating an atmosphere of panic in societies and markets. Outside April March and early

April, the most significant cases were seen in Iran and Italy. In the early days, Iranian officials described the virus as a conspiracy theory and fell behind in taking the first steps against the outbreak. As the severity of the situation began to appear within 1-2 days, measures were taken in Iran related to Covid-19. While the world looks a little cynically at the Covid-19 cases in Iran, it is not very interested in Italy, whose first cases occurred on the same days. In this process, unfortunately, Italy was unable to take measures.

There is an indisputable fact that Covid-19 has a negative impact on financial markets as well as in many areas, especially in the health sector. When we consider the consequences caused by the coronavirus from a financial perspective, it has not only effect financial markets, companies and investors, but also made consumers wonder how this pandemic will affect them. The aim of the study is in line with this curiosity and answers the following question: what is the relationship between gold and the pandemic?

There are many studies in the literature on the determinants of gold prices. However, the main purpose of this study is to reveal how gold prices are affected by a pandemic in Covid-19. Analysis in a study conducted to measure the impact of the Covid-19 Pandemic on gold prices, between 22.01.2020 -08.04.2020 were estimated using the ARDL and ECM model. In addition to the number of Covid-19 cases, interest, foreign exchange, and fuel prices will be included in the analysis.

In the following parts of the study, selected works finished prior to this study will be reviewed under literature review first, followed by aim of the study which will include data sets and the other key variables used in our study. Then, data and methodology to be used will be explained, followed up by the results and conclusion sections.

CHAPTER 1
LITERATURE REVIEW

Since the World Health Organization declared a pandemic on March 11, 2020, the study of the effects of the Covid-19 virus on financial markets has become important. The time factor plays an important role in studying the effects of a global epidemic. In this part of the study, although a limited number of studies related to the Covid-19 virus will be discussed, and other studies examining the effects of other pandemics on financial instruments will be discussed. Abourin et al. (2020), in their work referring to the economic recession and ruins created by the Great Depression on the world, they mentioned the similar effects of viruses such as SARS and MERS of coronavirus origin. In these studies, they concluded that the number of cases of the Covid-19 pandemic had an impact on economic growth and development. In their study, Jana and Das (2020) evaluated whether investment instruments were a safe port during the Covid-19 epidemic in terms of risk over Bitcoin and Gold. In their study, they used capital market indices for ten sectors. Gold is seen as a safe and powerful investment vehicle, while bitcoin is seen as a weaker Haven, according to the study's findings. In his study, Albulescu (2020) examined oil prices and the Covid-19 pandemic with the ARDL model, addressing it together with VIX, Cboe data. He estimated the total number of Covid-19 cases with ARDL modeling along with daily oil data. Considering the findings, it concluded that Covid-19 case numbers had a negative impact on oil prices. Corbet et al. (2020), in his work, examined the relations of cryptocurrencies with the Chinese stock exchange through GARCH modeling. The study included Covid-19 as a dummy variable and examined before and after. Accordingly, during the period when financial channels are in crisis, it is stated that a certain time must pass to determine how new instruments such as cryptocurrencies will be perceived by investors. According to the results of the GARCH model conducted at the same time, it was concluded that the outbreak influenced the volatility of bitcoin and gold. Zeren and Hızarcı (2020) investigated whether the Covid-19 epidemic influenced selected stock market

indices. Stock market indices, Covid19 case and death numbers were considered and structural fracture unit root tests and Maki co-integration analysis was performed. Accordingly, matching between the stock market indices and the cases in the selected countries was determined. But in Italy, Germany and France, investors were not affected by Covid-19 cases in terms of investment behavior. Jabotinsky and Sarel (2020) explored how cryptocurrencies such as bitcoin will follow the direction of traditional investment instruments such as gold in their study, where gold is examined as changing control. According to the findings, gold is considered low risk by investors in the Covid-19 process, as in other global crises. In their study, Conlon and McGee (2020) examined how Bitcoin is perceived as an investment vehicle from the point of view of investors during the epidemic. In the study, S&P500 data and Bitcoin prices were evaluated over Covid-19 in modeling with daily data between 2010 and 2020. During this period, it was observed that the low risk of Bitcoin moved in the direction of increasing. Ramelli and Wagner (2020) noted that the Covid-19 pandemic has turned into an economic crisis magnified through financial channels, noting that the problem of capital accumulation can lead to significant crises in terms of public investment, as investors experience a lack of liquidity and go on the path of cashing in their savings. Gosh and others (2004) noted that there is a statistically significant relationship between gold prices and inflation. According to the findings of the study, rising inflation rates increase the price of gold in an economy with a lower interest rate. In their study, Kiohos and Sariandis (2010) estimated oil prices and gold prices using the gjr-GARCH model with a daily time series. According to the results of the model, in which they used the yield of gold as a variable, they noted that oil prices have a positive impact on energy markets, and therefore also have a positive impact on gold prices. Şit and Telek (2020), in his work, the effect of the Covid-19 pandemic on the world dollar index and gold prices were investigated. Data between 01 March 2020-07 May 2020 are included in the analysis. In the study, the dollar index and gold prices were taken as variable variables, the number of world Covid-19 cases and the number of people who died from the pandemic as independent variables. Khatami-J cointegration test and Khatami-J

Asymmetric causality test were used as methods in the study. In the study, it is seen that there is a relationship between the dollar variable in the world and the number of deaths. In addition, when the dates of structural breakage are examined, it is seen that the World Health Organization qualifies Covid-19 as a pandemic on March 17, and there are serious increases in the number of cases. i It was concluded that the number of cases caught in the Covid-19 pandemic and the number of deaths from the pandemic had an effect on world dollar and gold prices. In the analysis, Sarı and Kartal (2020) performed using the ARDL Boundary Test, the same directional relationship was found between the number of COVID-19 daily cases and gold prices in the commodity market. The positive response of gold prices to the number of cases during the COVID-19 outbreak reveals the uncertainty in the markets. Increasing number of cases and deaths negatively affect the course of the economy globally and show that countries with intense epidemic are vulnerable. Financial actors are turning to gold, which is a commodity they feel safe. Onali (2020) showed that the number of deaths reported in Italy and France has a positive effect on VIX returns. During the period experienced with the COVID19 outbreak, there was an increase in financial volatility, and the VIX Index reached historic record levels. By following the VIX Index, financial actors have an idea about the fear in the markets and from this they enter into the idea of investing for the future. It has been revealed that the VIX Index data will be useful for investors to make the right decision during this epidemic, where historical fluctuations are experienced in financial markets. According to Çevik, Yalçın and Özdemir Yazgan (2020), in order to stimulate the economy, most of the countries have taken measures to increase domestic demand through monetary expansion. Since the extent of the damage that COVID-19 will cause on the economies of the country cannot be predicted, the damage it has created has been felt not only in the real economy but also in the financial markets. For this reason, small and large investors have turned to gold, one of the alternativeinvestment tools. One of the events caused by the COVID-19 virus is the USA's filling of oil stocks and the drop in oil prices as a result of the decisions of OPEC members. It is obvious that this situation is unsustainable for both

financial markets and oil exporting countries. The cointegration relationship between the total number of cases and oil and gold prices was investigated in two and three ways. According to the results obtained, both bilateral and triple cointegration results showed that the total number of cases and oil and gold prices were cointegrated.

1.1.Properties of Gold

The symbol of gold on the periodic table is Au, atomic number 79, atomic weight 197. Its specific gravity is 19.3 gr/cm3, its melting point is 1.063 0C and its durability is 119 kg / m2. Gold is a precious mine that has been used for centuries to make money and jewelry. Gold is a mine that is resistant to acids, can be found in a Free State in nature, can be easily processed, does not easily undergo chemical reactions, has a high thermal and electrical conductivity. For these reasons, it is used more in the fields of technology and industry today. Gold, which also has an important place in economic life, is one of the important value storage units today due to the fact that it is little in nature, has a limited production and can always maintain its value while being a means of change in the past. Gold has been used as money for a very long time. But in addition to being used both in the fields of industry and technology mentioned above, and in the economy as a means of storing value, jewelry is a place of use that has not changed for ages. Gold is used in combination with metals such as silver, nickel, copper, palladium. The ratio of the gold in alasim to the weight of alasim indicates the purity of gold. This ratio is also expressed as a thousand, and gold, which is only a thousand in a thousand, is considered pure. Troy ounces and kg units are used in the international trade of gold. Troy ounces is expressed as ounces. 1 troy ounce= 31,1038079 G and 1kg=32,1507425 ounces. The purity of bullion gold traded in the international gold market is 995 per thousand. The use of gold varies according to social structure and geographical regions. But the limited production is the main reason why gold is a valuable mine. As is known, in economics, the less the product-substance that people want to have, the higher the price. In gold

production, the inability to increase production according to the mobility of gold prices leads to low price flexibility of production. Based on this, it is quite reasonable and appropriate to say that the supply of gold does not respond to the change in the price of gold in a short time. Gold is not an easy-to-give-up mine because of its chemical and physical properties, and it is necessary to distinguish it from other precious metals because of its place in the economy. Gold has been used as a means of change in the monetary system for many years. Today, it continues to be used as a means of saving, storage and reserve. Gold has an important role in the world economy. High inflation, political and economic uncertainties, fluctuations in exchange rates encourage investment and speculation (Er, 1988: 8).

1.2. Place of Gold in Monetary System

Gold, for the first time in the sense of money in China. It was used as an alternative to silk in 1091. Gold, which began to be used as a tool of change in ingots whose weight was stamped by official authorities, is the only tool of change recognized by the whole world today (Vural, 2003: 6).

Since the Golden Ages, it was previously used as a means of change, but it continues to be used as a means of investment and storage, although it has lost this feature as a result of changes in the economy. 19. although gold, which has a very large share in national reserves, has been replaced by alternative investment instruments in foreign currency with the increase of international trade and the development of financial markets, it still remains important. The best example of this situation is that gold is an indispensable element of the reserves of central banks. It is possible to divide the place of gold in economics into four periods. These; gold in the mercantilist system of thought, gold in the classical system of thought, gold in the Keynesian system of thought, and the era of the free gold market.

1.3. Gold in The Mercantilist System of Thought

This doctrine, which links the source of prosperity and wealth to the abundance of precious metals, deals with economic policy in terms of the development of states. They suggested that in an economic system where there is no banking system and precious metal production, only through trade can the amount of gold-silver be increased. According to the system, these mines must be collected in the hands of the state and stored by the state. The state must take all measures to improve trade. For example, it should ensure the monopolization of trading companies and their security by creating an army. Access to precious metals abroad must be prevented. For this purpose, high customs duties were imposed on imports. It should be known that in the mercantilist period, the increase in precious metals and the increase in the level of prosperity do not mean the same. Wealth can be increased by employing cheap workers in very bad conditions. This is contrary to the science of economics; whose goal is to ensure the well-being of people.

1.3.1. Gold in The Classical System of Thought

The acceptance of the gold standard under the basic assumptions of classical thought contains some rules. First, the monetary authorities of all countries must determine the official gold value of their national currency. The monetary value of gold is equal to the constant weight and purity it contains (Turan, 1980: 14). Another rule is that each Monetary Authority must buy the bullion brought to it and print the bullion as coins. Therefore, the Gold Reserve in the country will always be equal to the domestic money supply. Another rule is that the Monetary Authority, which must buy the bullion that comes to it, thus prevents the price that can move below the official price. Supply and demand for gold at the official price have infinite flexibility. But in this case, the Monetary Authority may lose control over the amount of money, while keeping the official price of gold constant. The most important feature of the gold currency standard system is that it activates the automatic gold mechanism. Thus, the entry and exit points of gold

are determined. When all countries apply the gold currency standard, the exchange rate will remain constant at a level that determines the gold parity of the two countries ' currencies, and if foreign trade is also free, the balance of payments will automatically balance at this rate (Aslan, 1999: 8). Because the gold standard is universal and each country defines its own money with gold, the coins of all countries are connected to each other. For this, there is no need for a foreign exchange market like that of today at that time.

1.3.2. Gold in The Keynesian System of Thought

In the classical system, the place of gold in the balance of payments is important. However, Keynes discussed this and stated that the deficit in the balance of payments will not be closed due to price changes, and that the changes in interest and income, which are two important elements of this deficit, should be considered. According to Keynes, when a country that has a deficit in the balance of payments loses gold, it will first reduce the money supply and raise interest rates, and accordingly, national income will decrease through a multiplier. For a country that gives an excess in the balance of payments, the opposite will be the case. In classical thinking, it was assumed that the loss of gold and the reduction of the money supply were one-to-one, but the facts do not correspond to this assumption. In addition, although classical thinking predicts that central banks will comply with the rules of the system, central banks immediately reduce the money supply when gold is lost. If they do not, the price changes predicted by the classics do not occur immediately.

1.4. Free Gold Market Period

In accordance with the "Group of Ten Agreement" signed in August 1975 with the participation of the group of Ten and Isvicre, gold was removed from reserve liability in the monetary system, the economic validity of the official gold price was eliminated, and the transition to a floating exchange rate system between different currencies of countries was based (Pringle, 1993: 20). With the collapse of the "Bretton Woods Gold Exchange System", the property of gold as a means of exchange has completely disappeared. However, with this development, the restrictive measures existing in the free 14 markets have begun to be abolished. After 1974's central London and Zurich gold markets, in addition to other markets began to develop. Gold is used today to protect against inflation. In addition, it is reliable in political and economic uncertainties and has the property of being a financial investment tool. For these reasons, gold has an important place in the reserves of central banks today.

1.5. Gold Demand on Earth

Nowadays gold has a different place in economic life than in the past. Gold, used as a means of change in the monetary system in the past, is a valuable mine that is now used in areas such as industry, agriculture, technology and, unlike other economic goods, is a means of storing value. Although gold is difficult to produce, it is used in many fields today. If you need to list the most common areas of use of gold, the jewelry sector is in the first place. It is followed by industrial gold demand. The demand for gold for investment purposes and the official gold reserves of central banks also occupy an important place in the demand for gold. In addition, futures and speculative gold purchases, which are hedging operations to avoid being affected by possible price changes in the future, are also in demand for gold. The revival in the demand for gold in the Modern world is the rise in demand for gold bullion for investment purposes, especially after Japan's Kobe earthquake in 1995. But the countries where gold is frequently consumed are

China, India, Turkey, the United States, and the Middle East countries. Based on this, it can be said that gold is a traditional investment tool, in addition, it is used in the developing industry.

1.5.1. Gold Demand in Jewelry Sector

The area where gold is mainly used is the jewelry sector. The demand for gold jewelry varies from country to country and area of use. In developing countries, jewelry is used for jewelry purposes, while in developing countries it is used for investment purposes. The most important indicator of this is that the demand for jewelry goods, which has been processed over the years in developing countries, has changed. Based on the gold demands of developed and developing countries, it can be assumed that the relationship between the growth rate, income level and welfare level of those countries is directly proportional. People with high income levels increase the amount of money they allocate to gold jewelry. Psychological and social reasons, fashion, tastes and preferences are also factors affecting the demand for gold jewelry (Neuberger, 2001: 22). In every country where gold is demanded, jewelry production is carried out in absolute form. Some of these countries process the gold they demand in their own countries and turn it into finished goods, while others meet the needs of finished goods through imports from countries specialized in this regard. Many of the developing countries, such as Turkey, India, Saudi Arabia, Egypt, Brazil and Mexico, have a national gold jewelry manufacturing industry. In countries such as Kuwait, Abu Dhabi, the United Arab Emirates and Iran, the demand for processed jewelry is met by imports from countries such as Turkey and Italy (precious metals and Markets, 1999: 20).

1.5.2. Industrial Gold Demand

The gold mine is strong in terms of chemical and physical properties. Chemical resistant, oxidation resistant, heat and 19 good conductors of electricity, non-corrosion, reflective, easy to process and Permanent, Gold is in great demand in the industrial field. The areas generating industrial gold demand in developed countries can be listed as follows: - jewelry sector (which has the largest share in industrial gold demand), - electronics sector demand, - Foreign sector gold demand, - gold demand for medal and commemorative coin printing, - official currency printing. Currently, the demand for gold in the field of industry and medicine is estimated at about 20%. In recent years, in addition to electronic connections, the use of gold has increased in the chemical industry and in the production of heat-resistant glass. But the use of gold as an industrial raw material makes it a traditional market commodity. In other words, it varies according to the price of gold, the price of substitute goods, the demand for the goods in which it is used in its production, and the rate of economic growth (Lipschitz and Otani, 1977: 43). In this sense, the best example is the use of other materials, such as titanium and porcelain, instead of gold, in the construction of diş in recent years. Similarly, the electronics industry has taken the path of reducing computer chips (precious metals and Markets, 1999: 33).

1.5.3. Electronics Industry Gold Demand

Although it is quite expensive compared to other metals, corrosion resistance and high conductivity due to the electronic device 20 used in the construction of gold, more high-tech defense systems used in the aerospace industry. The countries that use gold in the production of electronic goods are the United States and Japan. However, countries such as Taiwan, Hong Kong and South Korea have subsequently increased the amount of gold they use in the electronics sector, depending on their industrial production strength. Gold demand from the electronics sector is closely related to the development of the world economy. The

electronics industry demanded 95.3 tons of gold in 1980, while 89 tons of gold was demanded in 1982, when the chemical economy went into decline. In 1983, with the acceleration of computer production, the amount of gold used in the electronics industry increased rapidly (precious metals and Markets, 1999: 25). But in the following years, the use of gold was reduced by using alternative metals in the electronics sector due to the increase in costs. Due to technological developments, some electronics manufacturers have begun to use palladium-nickel alloys instead of gold, further thinning the gold they use for coating various goods. Another reason why the amount of gold used in the electronics industry does not increase much is the reduction in the size of many electronic circuits and products. In 1997, the amount of gold used in the electronics sector increased by 13%. 16% growth was recorded in the United States, which is the leaders of this sector, and 11% in Japan. Although it is known that gold is very suitable for electronic applications, it can only be estimated how wide the field of use is in reality. Gold also finds a low amount of use in electrical appliances. In addition, due to its high reliability, it is increasingly used in car airbags (precious metals and Markets, 1999: 25).

1.5.4.Dental Gold Demand

Gold demand in the mining sector, which has a small share in total gold demand, varies depending on the prices of substitutes such as titanium and porcelain. Due to the increase in the price of gold, other materials were used in the field instead of this mine. In addition, the reduction of social health insurance payments made by some countries, mainly Germany, has also led to a decrease in the demand for gold in the foreign sector over time.

1.6. Gold Demand for Medal And Commemorative Coin Printing

At the beginning of the 1980s, many countries in the Middle East, which produced oil and were highly influential in the gold markets, reduced their demand for gold in parallel with the decline in oil prices. Although coin printing varies from year to year depending on the economic and political conditions in which countries are located, the demand for such coins is gradually weakening around the world. The printing of medallions and commemorative coins increased to a total of 42 tons in 1997. The increase was mainly recorded in Turkey and India, which accounted for almost 70% of the market. Jewelry gold minted by the mint in Turkey is considered medallion coins according to world standards. Coin and commemorative coin printing in Turkey increased by 30% to 18.3 tons, while in India increased by 57% to 11 tons (precious metals and Markets, 1999: 29).

1.7. Demand for Gold for Official Money Printing

Another area where gold is in demand is the demand for gold for official currency printing. This demand is met by the mint in Turkey. In fact, these gold (Republican gold, Reşat gold) can also be considered as investment gold demand. This situation is different in other countries. The interest of today's people in gold coins peaked when the gold coin “Kruggeard”, issued by the Republic of South Africa in 1978, sold 187 tons in the same year. After this success, the United States, Canada, the United Kingdom, Japan, China and Australia printed their own gold coins and supplied them to world markets. Far Eastern investors generally prefer Canadian “Maple Leaf” gold with a purity of 999.9/1000 and Australian “Nugget” Gold, but do not demand American “Eagle” gold with a purity of 916.7/1000, which is set lower than these coins. People buy such gold either because they find it cheap or because they believe its price will rise further. Gold coins with charm and minted in very small numbers are called “collection money”, coins that carry as much value as the amount of gold they contain are called “bullion coins”. As can be expected, the price of coins with numismatic

value is determined not by the amount of pure gold they contain, but by the supply and demand of collectors. (Precious metals and Markets, 1999: 30).

1.8. Central Banks Demand Gold

After gold is refined, it is sold in bullion on national and international markets or stored in reserves by governments. Some countries buy gold for the purpose of diversifying their assets against price declines, as they view gold as a value that needs to be considered against political negativity and in its entirety, while others buy it for commercial purposes, possibly for the purpose of selling when the gold price recovers at significant rates. In addition, those who want to earn interest income by lending their gold to the market also buy gold. The gold market has been dominated by monetary authorities for centuries. During the gold monetary system (1870-1930) and the Bretton Woods system (1944-1973), until 1968's monetary authorities ensured that its price remained constant, owning large amounts of gold. However, after the abolition of gold as money (after 1971), there was no significant change in the policies of central banks related to gold (Aslan, 1999: 16). Only the United States and the IMF carried out the sale of a certain amount of gold from their stocks, while other monetary authorities hid or even increased their gold reserves. Gold is still in the interest of central banks today as an international reserve tool. Central banks are obliged to hold gold as an international reserve instrument, whether its price is close to the market price or at a level determined by a fixed official price. Central banks have different motives for holding gold in their hands and trading with it. For example, precious metals, which threatened and shook the financial system in the 1970s, decreased significantly in their share of portfolio preferences, which were turned into ordinary goods in the 1980s. For today, there is a trend in the opposite direction. Similar rises experienced in 1680-2000 were stopped by the sales of central banks and changed direction, ensuring that the upward trend was in the direction of a decrease.

Although the share of gold in the total reserve has decreased over the years, a certain amount is necessarily included in the reserve of central banks. The main reason for this is that gold prices fluctuate in the short term in the historical process and retain their true value in the long term. Gold in the Reserve, unlike any foreign exchange-based investment instrument, is not directly affected by the policies of countries because it is not included in the obligations of any country, and the universal acceptance of gold as the "last resource that can be applied" also makes gold important for central banks. Despite the disadvantages that may occur in foreign exchange markets, stock markets or securities markets, the fact that gold can protect itself and be cashed in the market when necessary is considered the most important reason why central banks hold gold (Ferhani, 2003: 2). Risk minimization in the portfolio can be achieved through asset diversification. The fact that the return on gold is inversely proportional to most investment instruments causes central banks to be in the reserve portfolio.

1.8.1.Demand for Gold for Investment Purposes

The most important reason for investment gold demand is the drive to profit. By intensifying forecasts and expectations that gold prices will rise in the market, investors and speculators active in financial markets are increasing the demand for gold. Investors and speculators aim to make a profit by buying gold at the current price level and selling it at a high price that will be realized in accordance with their future expectations (Abken, 1980: 3). Gold investment can be realized in three ways. Buying and holding gold directly as bullion or gold coins, investing through a Gold account through a bank or intermediary, making forward-looking futures transactions. The factors determining the price of gold for investment purposes can be listed as follows: macro and micro balances such as interest rates, inflation rate, economic growth rate, foreign exchange prices, international political tensions, returns of alternative investment instruments (Bordo and Schwartz, 1994: 27). Demand for gold for investment purposes usually increases with a decrease in interest in other investment instruments. In the days when

alternative investment instruments provide high returns and securities markets are moving, investors ' demand for gold decreases.

1.8.2. Gold Demand for Storage Purposes

Demand for gold for storage is a demand for gold for non-profit, trust element and value preservation in the short term. The important thing here is that gold is bought for long storage. In other words, the goal is not commercial, it is aimed at collecting wealth. Gold is withdrawn from the market for long periods and stored. Gold is seen as an instrument of prestige, especially in developing countries.

1.9. Gold Supply in The World

M.He. Since 4000, 100 thousand tons of gold has been mined, of which about 40 thousand tons are distributed to official reserves and gold coins in circulation, 30 thousand tons are distributed to gold jewelry and 26 thousand tons are distributed to private investments. It is estimated that about 4 thousand tons of gold was lost (gold, 1999: 11).

1.9.1.Gold Mine Production

Mineral production is undoubtedly one of the most important sources of the world's gold supply. About 70% of the world's gold supply is provided from gold deposits. 18. at the beginning of the century, with the discovery of Minas Gerais mines in Brazil, since 1744, the evaluation of Siberian gold mines, the total production of gold in the world has increased almost twice as much as in the previous century. The world's gold supply reached 80 thousand tons with the discovery of California gold mines in 1849, the discovery of Australian gold deposits in 1851, and the discovery of South African Witwatersrand mines in 1866. Until 1850, only 10 thousand tons of gold were obtained, while in the later period this figure reached 80 thousand tons. This figure shows that about 600 tons

of gold are produced annually. In addition, unlike other raw materials, the increase in the price of gold leads to a decrease, not an increase in production. South African businesses, which form a cartel between them, cut production when prices rise. A 30% decrease in production in South Africa since 1970 is an indicator of this. In addition to fluctuations in the price of gold, gold production is dependent on the policies of certain major producing countries. For this reason, production and sales problems related to political factors should not be neglected. In addition, gold production, while this mine is not the only source of supply, it cannot be said that all the quantities extracted also reach the market. It is known that a significant amount of gold is kept dormant in both private and public bodies. It is a fact that when these stocks are offered for sale, the world's gold supply will increase significantly. Another reason why the amount of gold mined does not fully comply with the market supply is the policies of the producing countries, as mentioned above. All of the gold produced during periods when prices especially increased was sold, while reserves of previous periods could also be released to the market.

1.10. Gold Supply in Turkey

The world's gold supply consists of gold extracted from gold mines, scrap gold and sales of official institutions. In Turkey, most of the gold supply is covered by gold imports and scrap gold supply.

1.10.1. Central Bank and Istanbul Gold Exchange

Before 1980, it was forbidden to import gold in Turkey. During this period, the amount of gold entering the country illegally is estimated to be around 80 tons per year. Gold smuggled into the country was a very important resource for importing raw materials and other goods in Turkey during the period when foreign exchange reserves were very low and foreign exchange crises occurred (Kaufman, 2000). But the liberal winds that began to blow in line with the stability measures taken

in the 80s brought liberalization of gold imports, albeit in the monopoly of the Central Bank. A significant effort has been made to include the underground gold trade in the registered economy, removing all prejudices (Özatay,2010:39).

1.10.2. Scrap Gold Supply

As it is known, the supply of scrap gold is provided by the people, especially jewelry, gold coins, commemorative coins, medallions and similar gold items that they sometimes sell out of cash need, sometimes to buy a new one on the basis of replacement. Turkey is one of the world's leading countries in the supply of scrap gold, along with India, Saudi Arabia, Indonesia, Egypt, the United States and Italy. In 2008, Turkey supplied 199 tons of scrap gold and ranked first in the world, accounting for 16% of the entire world's scrap gold supply (Unay, 1988:822). In 2009, Turkey's scrap gold supply amounted to about 150 tons. During the economic crisis in 1994, there was a large increase in the sale of scrap gold to the public, and the gold collected by jewelers was sold to the Central Bank of the Republic of Turkey. During the crisis in the Turkish economy in the fourth quarter of 2000 and the first half of 2001, the supply of scrap gold increased compared to previous years

1.10.3. Gold Supply of Gold Mining Companies

The amount of gold extracted from mines in Turkey has been increasing continuously since 2001. It is estimated that between 15-16 tons of gold were produced in Turkey in 2009. Gold miners received a full value added tax (VAT) refund of the money they spent on production when they exported the resulting ore to Switzerland, while the same tax return was incomplete when they refined and sold it domestically. In a communique issued in 2009, the Ministry of Finance eliminated the tax disparity between the export of ore gold and the domestic refining. With this communiqué, which came into force on March 1, 2009, the possibility of gold being able to recover VAT in domestic sales was provided and

the way for gold to be sold internally by refining the ore in Turkey was opened. For example, Koza Altın preferred to export the gold mine extracted until 2010 due to VAT refund and price advantage and carried out its foreign sales through the Metalor company in Đsvicre. As a result of the published communique, Koza Altın signed a one-year contract on 18.03.2010 with a refinery established in Turkey to conduct refining operations abroad. As can be seen, there are no obstacles left for gold extracted in Turkey to meet some of its domestic demand by making it standard in Turkish refineries. It is very likely that gold mining will continue in the following years, increasing the importance of Turkey's gold supply.

1.10.4. Gold Demand in Turkey

Although the demand for gold in the world and in Turkey does not differ greatly in Variety, the weight of gold demand in different consumption varieties varies. In addition to the fact that the most used area of gold in Turkey is the jewelry sector, it was also used as money during the Ottoman Empire, which was considered the most suitable tool for evaluating savings, and its accumulation became a traditional habit. After the proclamation of the Republic, in accordance with the economic policies implemented, it was the main accumulation tool and assurance, especially of the traditional segment (Gürsoy, 2009:48). Gold, the classic investment vehicle of the Turkish people, has been undergoing a significant change process in recent years. Gold, which is demanded as a jewelry tool in weddings and circumcisions, as a means of investment and assurance in monetary savings, has lost its place somewhat as a result of the increase in alternative investment tools (Gürsoy, 2009:52).

1.10.4.1. Demand for Gold for Manufacturing Purposes

The demand for gold for manufacturing is the demand for gold in the jewelry sector, the demand for gold for printing gold coins, the demand for gold in the electronics sector and other sectors, and the demand for gold in the dental sector in Turkey. More than 99% of the demand for gold for manufacturing in Turkey is the demand for gold in the jewelry sector and the demand for gold for printing gold coins. The demand for gold in the electronic industry and dental sector is almost non-existent in Turkey.

1.10.4.2. Demand for Investment Gold

Jewelry production represents the product produced in jewelry. Turkey is one of the leading countries in the world both in jewelry and in demand for jewelry. Jewelry companies operating in Turkey produce part of the jewelry they produce to meet domestic demand, while the other part is produced for export purposes. But exactly how much jewelry is produced by jewelry companies for export purposes is not known with certainty. For example, the amount of gold sold to tourists coming to Turkey, the Laleli market (suitcase trade) is really difficult to access data about the amount of gold sold abroad in different ways. Even if the data is reached, the accuracy of the data is open to debate. Accurate and accurate data on jewellery exports are the data of Undersecretariat of Foreign Trade, Turkish Statistical Institute and IMMIB showing official exports. Most other data is predictive data.

1.10.4.3. Gold for Making Official Coins, Commemorative Coins, Medals And Medallions Demand

During the Ottoman Empire, the first gold coin was sunk during the time of Fatih Sultan Mehmet. The purity of this first gold coin, which was printed in 1478 and remained in circulation for centuries until the printing of paper money, was 0.993 grams and its weight was 3,207 grams. The other two important gold coins used during the Ottoman period are the gold coins minted by Sultan Reşat and Sultan Aziz, known as Reşat and Aziz. After the establishment of the Republic, these coins, which continued to be used for the first 15-20 years, lost interest in printing forgeries in Syria and were replaced by Republican gold, which was suppressed by the decision of the Parliament No. 1738 on August 18, 1951.

1.11. Gold Mining and Gold Refineries in Turkey

The amount of gold produced by the mining sector in Turkey is increasing every year. The amount of gold extracted in Turkey is important in terms of meeting some of the domestic market demand. The presence of refineries established in Turkey is important for the refining of this gold extracted from the mine and the gold that is planned to be extracted in the future and the gold resulting from the supply of scrap gold.

1.12. Gold Mining in Turkey

Throughout the history of civilization, Anatolia has been the cradle of gold and silver mining. The first mining institution established during the Republic period was gold exploration and operation. As of 2000, there is no gold mine in Turkey, Eti Holding A. in Kütahya-Gümüşköy a silver mine was operated by (Moe, Solheim, and Vale,2004:84). Because of Turkey's geology, which is very favorable for gold formation, a reserve is expected to be much higher than the operable Gold Reserve, which has been revealed. As a result of a study conducted

to estimate the gold potential of Turkey, it was calculated that the estimated gold potential of Turkey could reach 6,500 tons. In order to achieve this potential, $ 8 billion of exploration investment (venture capital) and $ 12 billion of business investment will be required (Eckbo, 2009:10). In Turkey in 1985, 17 foreign companies came to Turkey for searches after amendments were made to the Mining Law, which allowed companies with foreign capital to obtain mining licenses. But as of 2000, only three of the foreign companies remained, and the others left Turkey, deciding that the investment environment for gold mining was not suitable(Moe, Solheim, and Vale, 2004:86).On March 3, 2005, Koza Altın İşletmeleri A.Ş. (Cocoon Gold), Normandy Mining Co.P.it acquired all of its shares from Newmont Mining Corporation. Therefore, as of 2010, two foreign companies have remained in Turkey: Eldarado Gold (Tüprağ Metal Madencilik Sanayi ve Ticaret A.Ş.) and Anatolia Minerals Development Limited (Çukurdere Madencilik Sanayi ve Ticaret A.Ş.). With the entry into force of the Mining Law No. 3213, there have been significant developments especially related to Gold Mining. In the early 2000s, mixed leaching was performed in one of the gold mine deposits found as a result of searches, and in the other in 2006, gold was produced by mass leaching for the first time in Turkey. Despite the use of the latest production and environmental protection technologies applied around the world, gold mining faces various environmental and legal obstacles. Despite this, work is being carried out for production in several more mines.

According to information on the website of the Ministry of energy and Natural Resources of the Republic of Turkey, known gold deposits in Turkey and exploration efforts are concentrated in the Aegean, Eastern Black Sea and eastern Anatolia regions. Gold deposits, which are currently ready for production, contain gold in quantities ranging from 1.2 g to 12.65 g per 1 ton. Accordingly, Turkey's operable gold reserves total 700 tons. Turkey's operable gold reserve was calculated as 15 tons in 1990, 75 tons in 1995 and 340 tons in 2000, according to the Turkish Gold Miners Association (TGMA) data. But as a result of gold exploration, this figure has increased to 700 tons. In the current situation,

competition in the sector is concentrated in search activities. In the next 3-year period, it is thought that domestic and foreign companies will participate in the competition in the field of exploration and will be concentrated in western Anatolia. In the field of production, competition cocoon Gold Enterprises A.Ş., Eldorado (Tüprağ Metal Madencilik Sanayi ve Ticaret A.Ş. Anatolia Minerals (Çukurdere mining San), which is in the process of allowing to start production with. ve tic. A.Ş.) is expected to pass among foreign companies such as. It is believed that domestic companies that continue their exploration activities will be able to start production activities in the later period.195 gold is produced in Turkey at the Ovacık Gold Mine in Izmir/Bergama district, at the Gümüşhane/Mastra Gold Mine, at the Kışladağ Gold Mine in Uşak/Eşme, at the Erzincan Iliç-Gold mine and at the Balıkesir Havran Gold Mine (Erdinç, 2010: 186).

1.12.1. Bergama - Ovacık Gold Mine

Gold production at the Ovacık gold mine, which is owned by Koza Altın Enterprises, has been continuing since May 2001. Between May 2001 and December 2007, 30 tons of gold and 28 tons of silver were produced in Bergama. Also, the facility provides job opportunities for 530 people. (Curtis, Gladish, Guntupalli, McElnea, 1994-1995:238).

Koza Altın entered the gold production business by purchasing the gold mine located in Ovacık (Bergama) in March 2005. In 1989, Eurogold first entered the gold quarry business in Ovacık, but after lots of pressures and lawsuits from the environmentalists they had to withdraw and transferred their business to Normandy. In the agreement, Koza Group purchased the Ovacık mine with a total of 44,5 million dollars. Under this agreement, it includes Normandy shares for 40 million dollars and 4,5 million dollars for subsidiary of Normandy which is called Mastra. (Griffith,1997:3).

Gümüşhane-Mastra Gold Mine's started gold production at the end of 2008 at Gümüşhane-Mastra Gold Mine, which is owned by Koza Gold Enterprises. Mastra will produce 15 tons of gold and 9 tons of silver. Also, Mastra provides job opportunities for 400 people. (Curtis, Gladish, Guntupalli, McElnea, 1994-1995:238).

1.12.2. Uşak-Kışladağ Gold Mine

Tüprag Metal Mining Co.P.the Usak Kışladağ Gold Mine, owned by Usak Kışladağ, was realized with an investment of 167 million dollars and gold production started in May 2006 and 630 people are employed. 105 tons of gold will be produced in kışladağ. Tüprag Metal Mining Industry and trade Joint Stock Company Is the company of Eldorado Gold, headquartered in Canada, established in Turkey.200 70,895 ounces of gold were produced in 2006, 135,306 ounces in 2007, 190,334 ounces in 2008, and 237,210 ounces in 2009. The equivalent of 237,210 ounces produced in 2009 is about 7.34 tons. Estimated production for 2010 is 255,000–265,000 ounces (Tyler, Donn Mayuri, and McElnea, 1994-1995).

1.12.3. Erzincan Iliç- Gold Mine

Gold production will start in the fourth quarter of 2010 at the garbage Gold Mine in Erzincan Iliç district owned by ş. 55 tons of gold and 63 tons of silver will be produced here. 500 people will be employed at the Erzincan Iliç/ Gold Mine, which will be realized with an investment of 200 million dollars. Çukurdere Mining Sanayi ve Ticaret A.Ş., United State. -based company of Anatolia Minerals Development Limited (Griffith, 1997:3). Balıkesir Havran Gold Mine is a mine owned by Koza Gold Enterprises. No chemical facilities are established in Havran mine and only open January and pickling activities are carried out. After 2000, gold production began to increase in Turkey. According to the data of the Gold Miners Association of Turkey, this figure was approximately 15-16 tons in 2009.

1.13. Gold Refineries in Turkey

In the days when gold prices decline, volume and scrap return are significantly reduced, scrap return is collected in Istanbul through thousands of jewelers and sarraf spread throughout Turkey, and these scrap gold are converted into standard bullion gold through 3 refineries listed on the Istanbul Gold Exchange. Apart from the 3 refineries in question, there are also those who refine and sell gold in non-standard form. The purity setting of standard precious metals to be traded on the stock exchange must be at least 995/1000 for gold. On 07.05.2010, Atasay became the first Turkish company to enter LBMA's "Good Delivery" List. By obtaining a certificate from Atasay LBMA, the gold coming out of the Turkish mines will be stamped from Turkey and opened to international markets. Tüprağ refines the gold it produces in Turkey at the Istanbul Gold Refinery and offers it to the market domestically.203 Koza Altın signed a one-year contract on 18.03.2010 with a refinery established in Turkey to conduct refining operations abroad.204 however, no clear information has been given about which Refinery it is. There are three refineries from Turkey on the list of refineries whose bars and bullion can be traded on the Istanbul Gold Exchange.

1.13.1. Istanbul Gold Refinery A.Ş.

The Istanbul gold refinery project started in 1996 with the support of the Under secretariat of Treasury of the Republic of Turkey and the Istanbul Gold Exchange. Before 1996, there was no significant gold refinery and bullion producer in Turkey. The major shareholders of the company were the banks.205 in January 2002, Halac jewelry Ltd, which has gold refining and jewelry activities in Turkey. Ltd. he bought most of the shares of the project and the company. Since June 2002, it has continued its activities by changing the name of its current refinery to Istanbul Gold Refinery. In 2004, he moved the refinery to Kuyumcukent and established a large gold refinery. The company employs 60 people and has an

annual refining capacity of 100 tons. In 2004, it was accredited to the Istanbul Gold Exchange and in 2007 to the Dubai Gold Exchange Erdinç, 2010:204).

1.13.2. Nadir Metal Refinery Sanayi ve Ticaret A.Ş.

The company, which operates in Grand Bazaar, is one of the leading refineries in Turkey and is a producer of bullion gold. It introduced 1-pound ingots in 2006.

Unlike Istanbul Gold Refinery, its products are available in weights of 20 grams and 2.5 grams. It is accredited to the Istanbul Gold Exchange and Dubai Gold Exchange.

1.13.3. Atasay Kuyumculuk Sanayi ve Ticaret A.Ş.

In 2009, Atasay Kuyumculuk Sanayi ve Ticaret A.Ş. "International Gold and platinum refineries that can process bars and bullion on the Stock Exchange, as well as International Silver refineries that can process bars, Bullion and granules" have applied to the Istanbul Gold Exchange to be included as a gold refinery. The company's application was positively concluded as a result of the work of the commission created, and it was decided that the company would be included in the list of refineries as a gold refinery as of 17.04.2009 (Dallas FED, 199:5). Atasay Goldsmith successfully completed 6 months of inspection and adjustment-bullion testing processes conducted by the London Bullion Market Association and independent arbitrators authorized by this institution in different countries of the world and entered the list of "best manufacturers (good Delivery)" in the world as of 07.05.2010. It is also the only refinery in the Middle East, the Balkans and the Caucasus region to make the Good Delivery List. It produces gold ingots under the brand "Atakulche".

1.14. Mobility of Gold Prices in International Financial Crises

Since the closing of the gold window, gold has largely lost its use as an exchange tool and has taken its place in the financial market as an investment tool. Like all other financial assets whose price is determined in market conditions, gold prices have experienced periods of relatively little change, with periods of great rise and fall. With investors who expect to profit from their investments and want to protect their assets, it is of great importance to determine the volatility of gold prices and the factors affecting volatility, which are of great importance to producers, industrialists, central banks and the economies of the country. Examining what the volatility of gold prices is, especially during the financial crisis, whether gold prices have an impact on mobility and how they have an impact, will shed light on a better understanding of gold investment, which is shown as a "safe harbor" investment during the financial crisis. For this reason, the mobility of gold prices during the international financial crisis was analyzed in this study. In the financial literature, volatility is defined as the standard deviation of returns on financial assets and is used to express the total risk of that financial asset. There are different models for calculating volatility. These are: historical volatility (historical volatility models, implied volatility (implied volatility) models exponentially weighted moving average (EWMA) models autoregressive (AR) and moving average (Ma) models (Arma models), autoregressive conditional heteroscedasticity (GARCH) models and Stochastic volatility models. Determining which model to use to calculate the volatility of a financial asset is determined by its suitability for the structure of the data to be used. Financial time series are examined when financial asset prices are stable (stationary) unit roots and (unit root) while the series of financial asset returns are likely to be owned by the opposite characteristics and it can be seen that otokorelasyon low (Bollerslev,Engle and Nelson,1994,:2959-3038). However, accumulations can be seen in the volatility of return series, high volatility can be followed by high volatility, low volatility can be followed by low volatility. This, in turn, indicates situational variations that vary with time. Furthermore, the distribution of return

series can be separated from the normal distribution by thick tail and extreme heights (Canarella, & Pollard,2008). For this reason, in order to calculate volatility, which is expressed as the standard deviation of financial asset returns, it is necessary to first test whether these characteristics exist.

1.15. Factors Affecting the Mobility of Gold Prices

The mobility of gold prices increases during periods of international financial crisis. Although the volatility of the gold market is less than that of the money and capital markets, one of the features that makes gold investment attractive when considered as a financial investment tool is its volatility (Turk,2004:97). Although gold prices occasionally enter long periods of recession, they break these periods with big jumps, especially during periods of international financial crisis. Looking at other investment instruments based on gold, this situation is poor. For example, the volatility of gold-based stocks is 3 times the volatility of the New York Stock Exchange stock market (Updegrave, 2003:30). It can be said that this property of gold-based shares is due to their proximity to a capital market instrument rather than a gold investment. Similarly, gold investment instruments with the highest rate of Return are gold-based stocks, while physical gold investment can only take third place after gold-based funds. These characteristics of gold investment point to important points in explaining the mobility of gold prices. As can be seen from the charts, the volatility of gold prices occurs during long periods of calm but shows sudden increases and decreases. This, in turn, is due to the fact that gold is not much preferred as a financial investment tool. Except for certain periods, the volume of trading in the gold market remains limited and at a certain level, causing the volatility of gold prices to fluctuate at a certain level. It is also based on the fact that the mobility of gold prices is not as high as in capital markets. Given the total values of other investment instruments based on physical or gold, it is not possible to reach the size of the capital markets, and the volume of transactions and the number of investors trading are not as large as in the capital markets. But the mobility of gold prices increases during periods of crisis and

tension, especially during international financial crises. This, in turn, is due to the fact that gold prices are affected by psychological factors as well as financial indicators such as inflation rates, interest rates, growth rates and money supply (Batten, Ciner, and Lucey, Brian, 2010:69). Among these financial data, the most influential factors on volatility are unemployment rates, GDP and inflation, and many macro-economic variables affect volatility.

Another element that increases the mobility of gold prices during periods of crisis and tension is psychological factors. Gold, one of the oldest and most reliable exchange and value storage tools in human history, comes to the fore, especially during periods when trust in paper money is declining or disappearing. In cases where political and social tensions, events such as terrorism, war, insurgency, and natural disasters begin, people turn to the bottom, which is accepted almost everywhere in the world and is evaluated equally without dividing units. Examples of this can be seen in the Vietnam War, the US hostage crisis with Iran, the Soviet invasion of Afghanistan, and the war between Iran and Iraq. Another feature of gold that has started to emerge in recent years is that it is a safe haven investment. The return of economic expectations to negative, the deterioration of market data, the negative news and developments announced may increase the demand for gold in the expectation that the value of held investment instruments will decrease, which leads to increased mobility. Speculative transactions can have an impact on mobility because the gold market is smaller than the money and capital markets in terms of its structure and does not have a large volume of investors (Updegrave,2003:32). Examples of this situation include the OPEC embargo in 1974 and the increase in mobility with the decline of the country's credit ratings in 2010. When the international financial crises mentioned in the study are examined, it can be seen that the factors that increase mobility are as listed above. It can be observed that worsening macro-economic indicators in the Scandinavian banking crisis, the Latin American crisis, the South East Asia crisis and the Mortgage crisis, decreased confidence in national currencies, and increased safe-haven investment increase mobility. The fact that countries where

international financial crises began were widely filled with foreign capital investments, that crises jumped to multiple countries under the influence of contagion and that they were effective on a global scale has been an element that has increased the mobility of gold prices. it can be seen in the hostage crisis, the Soviet invasion of Afghanistan and the war between Iran and Iraq. Another feature of gold that has started to emerge in recent years is that it is a safe haven investment. The return of economic expectations to negative, the deterioration of market data, the negative news and developments announced may increase the demand for gold in the expectation that the value of held investment instruments will decrease, which leads to increased mobility. Speculative transactions can have an impact on mobility because the gold market is smaller than the money and capital markets in terms of its structure and does not have a large volume of investors (Updegrave,2003:32).

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1.16. Mobility of Gold Prices in the Istanbul Market During International Financial Crises

When the course of gold prices in Turkey is examined, it is seen that the period before and after the IAB is separated from each other by very sharp lines. Especially in the period before the CBRT began importing and selling gold, the price difference between the gold market in Turkey and the Swiss gold market is 1.83% on average. The most important reason for this is that gold is smuggled into the country, not through official roads. In addition, during this period, price increases were higher than in the world. During this period, high inflation and exchange rates in the Turkish economy led to higher price increases. With the establishment of the IAB, gold prices have gained parallels with the world market and the integration of the Turkish gold market with international markets has been achieved. In this way, the illegal gold trade was prevented from driving up gold prices, and the price differences were reduced to a minimum. In order to create gold investment alternatives in the Turkish economy and to enable the public to evaluate their savings under it, various gold and gold-based investment alternatives have been created. But it is difficult to say that these products are successful and create a lot of demand. Looking at the trading volume of the IAB, it is seen that almost all of it is formed in gold imports. In addition, most transactions consist of large transactions at prices received from abroad, small transactions account for a very low percentage.

In order to increase the effectiveness of the IAB and provide the Turkish people with an alternative to investing in gold, the precious metals lending market and the futures market failed to achieve the expected success. Before the futures market left the IAB in 2006, 70 contracts worth 774 thousand TL were traded in 669.5 transactions worth 17.7 million US dollars in a total of 90 transactions in this market. The precious metals lending market was similarly not favored, and by 2010, 1.2 tons of gold had been processed in just 45 transactions. Other investment instruments implemented with the establishment of the IAB to

diversify gold investment in Turkey have also not attracted much interest from investors. These include gold certificates, gold funds and gold depository accounts. But since the day they began to be implemented, they have not been able to become more than alternative investment tools and have not been able to achieve the expected success in increasing interest in gold investment.

Physical gold investment is most preferred among gold investment alternatives in Turkey, and other gold investment instruments have not developed much. Therefore, although it is an important importer and exporter country in the world gold market, it has a structure that reflects prices rather than affects prices. Since gold imports are carried out as consignment between major gold dealer banks such as JP Morgan, Commerzbank, UBS, Credit Suisse and Turkish banks, the prices generated in the IAB are also prices generated in international markets. When the mobility of the IAB is examined, it is seen that it has a similar structure to the mobility of the London market, and that the basic structure bears similarities except for the level of mobility increase. It is understood from the results that mobility is generally at 0.01 and shows increases and decreases from time to time. The main reason why mobility increases are less than the London market is because the market depth is less and its connection to international markets is not as much as London. What is needed to overcome this is that the IAB can become a more used market. From the IAB mobility chart, the IAB return varies over time. Although its volatility is lower in the domestic market than Ise and in the International sense than London, its standard deviation is also less. For this reason, it offers a safe investment alternative even if it is not very preferred. When the course of volatility is examined, it is seen that volatility has increased in the IAB with the 1995 Latin America, 1997 South East Asia and 2008 Mortgage crises, in the same way as the London gold market. In addition, increases and decreases caused by domestic economic developments are also effective during mobility. For example, the high level of mobility between 2002 and 2004 is closely related to the economic crisis and the resulting inflation. Mobility, which began to increase after the first quarter of 1995 during the Latin

American crisis, continued its influence until 1996 and was able to carry its influence until the end of the first quarter of 1996. The impact of the fact that the IAB has not yet been operational and the narrowness in the volume of transactions is felt during this period. The resulting increase in mobility was also instrumental in increasing demand from 80.8 tons in 1994 until the financial crisis to 139.4 tons in 1995 and 153 tons in 1996. Of course, this also has the effect of the amount of gold that began to be registered with the end of the illegal gold trade with the launch of the IAB.

In the South East Asian crisis, the increase in mobility became more pronounced, reaching 0.12 at the beginning of 1997 and 0.14 at the end of 1997. In 1997 and 1998, the demand for jewelry decreased in total demand due to high mobility. During periods of price increases, gold purchases for jewelry purposes slow down, while small investors also go on the road to cash in by selling some of their gold savings. A similar effect was observed during this period, with the outbreak of the Russian crisis in 1998 after the 1998 and South East Asian crisis, the demand for gold decreased in 1999, and the supply of scrap gold increased. In the IAB, there were very serious decreases in the number of transactions in 1998 and 1999, but the volume of transactions continued to increase.

The Mortgage crisis, which created the highest mobility in the London market during the international financial crisis, also had an impact on the IAB, with the impact of the crisis, mobility reached 0.015 in 2009. During the Mortgage crisis period, which brought about problems both throughout the Turkish economy and in the gold market, both the amount of transactions and the volume of transactions declined on the basis of TL and USD, and the total demand for gold declined by close to 50%. Due to insufficient demand, many jewelry stores were forced to close, while most manufacturers went on the path of shrinking their operations. In order to stimulate demand, companies have taken the path of reducing the weight of products, reducing their settings and increasing their composition with other mines (Arymbaev,2010:88).

Apart from the specified periods of the financial crisis, increases in mobility in the IAB were observed during certain periods. Between 2001 and 2004, mobility was above the IAB average. Although the economic and political crisis in the country is effective in this increase, a similar increase in mobility is observed in the London market during the same period. This, in turn, shows that the increase in overall commodity prices experienced globally was also an important factor in the increase in mobility in the IAB during this period and in the end of 2005 and 2006.In 2006, there was a global shock to commodity prices, and although the financial crisis did not reach its size, it was instrumental in increasing mobility.

1.17. Measures Taken in The World and Turkey to Reduce the Economic and Financial Effects of The Covid-19 Epidemic

Measures are being taken around the world to reduce the rate of spread of the Covid-19 virus and its negative impact on the health system. As part of the measures taken, the implementation of quarantines and Street exit bans stagnates life and, in this case, causes economic problems. The epidemic affects demand, causing people to stay at home, and consequently forcing manufacturing businesses to make planning changes, which leads to a negative impact on supply. Liquidity has become a serious problem for companies and funds, while negative effects on demand and supply pose a risk of "sudden stagnation" in economies. In order to resolve the negative effects of the epidemic on the economy and the resulting liquidity problem, central banks have introduced monetary expansion packages and financial support packages in governments. For this purpose, the FED and the White House in the United States announced a total support package of $ 6 trillion, and the European Central Bank (ECB) and Germany announced a total support package of € 390 billion. The swap line, which was last activated during the 2008 crisis, has been reopened by the FED for 14 countries. The International Monetary Fund (IMF) has announced that it will provide support to countries that need short-term dollar liquidity during the epidemic process (Vakıf

Yatırım, 2020). After the Fed's monetary policy easing and monetary easing steps, similar practices were applied by other central banks, and the country's administrations also announced additional stimulus packages. Many countries have implemented many measures, such as government guaranteed loans to companies, income incentives for employees who are unemployed due to the epidemic, tax and pay off. The FED held an extraordinary meeting 2 times in order to dispel the panic caused by the Covid-19 epidemic in financial markets around the world and limit its negative effects on the economy, reducing the policy interest rate by 50 basis points and then by 100 basis points. Thus, interest rates in the 1.50-1.75 band are reset. After these decisions taken by the Fed, the central banks of many countries, from Japan to Britain, China to India, Brazil to Mexico, Australia to Turkey, also went on the path of lowering rates. Countries aimed to support businesses and prevent layoffs in an environment where consumption is reduced, and spending is carefully restricted with financial support packages of 1% to 20% of their economic size. Another effort by governments is to delay and prevent the risk of recession that may occur in the economy by providing assistance to households. The March PMI indices released show that jobless claims are rising, and economic activity is hovering at its worst levels in history. It is stated that the effects of support packages can only be seen clearly at the end of the second quarter (Vakıf Yatırım, 2020).

As of March 10, 2020, when Turkey announced its first case of coronavirus, it has taken a number of measures to stop the spread of the outbreak, including travel restrictions, online attendance at universities and schools, closure of social spaces, curfews for under-20s and over-65s, and incentives to work from home. These measures were later supplemented by General curfews on weekends and official leave days in major cities. These social measures were followed by economic support measures. Along with the fact that central banks in many countries have reduced interest rates, the Central Bank of the Republic of Turkey has reduced policy interest rates by 100 basis points at its meeting on March 17, 2020. At the same meeting, in order to reduce the negative effects of the virus on the Turkish

economy, it was aimed to increase predictability by making flexibility in the management of Turkish lira and foreign currency liquidity of banks. Measures to provide banks with targeted additional liquidity opportunities and to support the cash flow of exporting companies through rediscount credit arrangements were also announced in order to avoid disrupting the credit flow to the real sector. A package called the “economic stability Shield” was announced by the government on 18 March 2020. In addition to the measures taken, the package emphasizes the continuity of employment, there are articles such as postponing interest and tax payments, minimum wage support, and regulation of pensions (VAKIFYATIRIM, 2020). Measures have also been taken to make more active use of flexible and remote working models for employment continuity, to facilitate short work allowance, to apply the compensatory working period applied as two months as four months, to provide temporary income support to workplace employees who are decommissioning production (TMB, 2020). Tax and insurance premium payments of businesses in the retail, accommodation, entertainment and logistics sector directly affected by the epidemic process have been deferred for six months. In addition, the same postponement was applied in some sectors, including businesses engaged in building construction activities. The Banking Regulatory and Supervisory Authority (BRSA) has decided to assist businesses in transferring liquidity by providing convenience in calculating the capital adequacy ratio and net foreign exchange position on bank balance sheets. Several concessions, such as tax and premium deferral, easy access to bank loans, have been provided by the government to ensure that firms stay afloat and continue their activities (TMB, 2020).

CHAPTER 2
AIM OF STUDY

Since the World Health Organization declared a pandemic on March 11, 2020, the study of the effects of the Covid-19 virus on financial markets has become important. The time factor plays an important role in studying the effects of a global epidemic. In this part of the study, although a limited number of studies related to the Covid-19 virus will be discussed, and other studies examining the effects of other pandemics on financial instruments will be discussed.

2.1. Data Set

Analysis in a study conducted to measure the impact of the Covid-19 Pandemic on gold prices, between 22.01.2020 -08.04.2020 were estimated using the ARDL model. In addition to the number of Covid-19 cases that are considered to have an impact on gold prices, variables such as interest, foreign exchange, and fuel prices were included in the analysis. In the study, where gold prices (GOLD) were considered as a dependent variable, Covid-19 Turkey case number (TCOVCASE), Covid-19 World Case Number (WCOVCASE), US Dollar rate (dollar), policy interest (PR), gasoline pump prices (OIL) arguments were used. When selecting the variables to be included in the analysis, the event was considered through the eyes of the investor. In this direction, for example, when choosing oil prices, gas station pump prices in Turkey were preferred instead of Brent oil prices. At the same time, it was applied to treat policy interest rates instead of overnight reference interest rates in the Turkish Lira (TL) as an interest rate. As is known, banks determine deposit and loan interest rates mainly according to the policy interest rate. Therefore, since an investor takes these rates into account when he requests a loan from the bank or wants to deposit money in terms, it would not be wrong to say that one of the factors determining demand for gold is policy interest. The reason the data set started from 22.01.2020 is because the number of Covid-19 cases in the world was first announced by the John Hopkins database. In

Turkey, the first case was identified on 11.03.2020. In the study, all variables were included in the model in linear form and Eviews-9 package program was used for analysis. Table 1 contains descriptions of variables and some descriptive statistics.

Table 1: Descriptive Statistics and Descriptions of Variables

Variables	Description	Reference	Max.	Avg.	Min.	Std. Dev.	Obs.
Dollar	Dollar Rate	investing.com	6.78	6.23	5.92	0.26	78
Gold	Gold Prices TL	investing.com	362.22	319.57	297.29	16.32	78
PR	Policy interest	tcmb.gov.tr	11.25	10.65	9.75	0.61	78
Oil	Prices (TL)	opet.com.tr	7.05	6.22	4.97	0.72	78
Wcovcase	Covid-19 World cases	John Hopkins database (2020)	1,487,870	259,413	555	375,426.50	78
Tcovcase	Covid-19 Turkey cases	covid19.saglik.gov.tr	38,226	3,435.99	0.00	8,401.70	78

2.2. Model

According to Peseran et al. determine the effects of Covid-19 and other variables on gold prices after the detection of dependent and independent variables. The panel Auto Regressive Distributed Lag (ARDL) boundary test method developed by (2001) was implemented. AEDL boundary test analysis provides researchers with some advantages over other cointegration tests; Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990) modeling. The first advantage is that the ARDL model can be applied regardless of the order of level i(0) and first-degree differences i(1), which are the stationary level values of variables. The second advantage is that the other analysis method of ARDL analysis can be applied for a small number of observation sets, without the need for a large and large number of data sets. A third and important advantage is that optimal latency levels at stationary levels of variables are not considered in other methods, but rather delays are considered in the ARDL boundary test. In the analysis of time series, the distribution of series, the structure of change, in other words, the character of the series is important. In this context, when selecting a method in time series, first, the mathematical specification of the series, the composition of

time and the structure of stasis are considered. In unit root tests developed to detect stasis, determination of stasis can be made by looking at whether the series has a unit root. Dickey-Fuller (1979) and later developed by Augmented Dickey Fuller expanded (ADF) and, later, Pesaran and Shin (1998) unit root test developed by,

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t \quad (1)$$

It is expressed in Equation (1). Accordingly, t denotes the time dimension of the series, while p denotes the correlation coefficient of the series in the autoregressive process estimation created by the delayed values of the series. the term constant refers to the trend of β. The ADF uses not T statistics, but Cheung and Lai (1995) Tau statistics created by Monte Carlo simulation, and hypotheses;

$H0$: $\delta \geq 0$, series is not stationary and contains one-unit root

$H1$: $\delta < 0$, series is stationary and not contain one-unit root.

Then it is decided which time series model and Method to choose for the series whose stasis is decided. If the series is stationary at different levels, the ARDL model based on the OLS method is applied. The ARDL model includes both autoregressive and delayed values of arguments. A process that allows series containing stasis at the level i(0) and i(1) to be modeled together primarily reveals a model that shows a short-term relationship. At the same time, the ARDL model shows the long-term relationships of the selected variables (if they are combined) together with the error correction model. If there is a difference in order between the series, it can be tested with the Engle Granger Co-Integration Test. But with the elimination of the weaknesses of the Johansen co-integration test, the developed Bound Test is used instead. According to the result of the Bound test, if there is a long-term relationship, the correction coefficient obtained from the cointegration relationship gives the speed of capturing the long-term of short relationships. Because the ARDL model is based on the OLS method as a method, it will be subjected to basic assumption tests.

2.3. ARDL Model

Cointegration tests are applied to examine the long-term relationship between variables. Cointegration tests require variables to be integrated to the same degree. This is a constraint for cointegration tests. However, Pesaran et al. (1996) suggested the ARDL approach, which allows testing the relationship between different degrees of integrated variables (Bahmani-Oskooee and Chi Wing Ng, 2002: 150). Later, this approach developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Pesaran and Shin (1999) and Pesaran et al. (2001) has become commonly used in cointegration analysis. ARDL approach is based on the least squares regession and unlike classical cointegration analysis, it is not necessary to apply a unit root test beforehand in ARDL analysis. The main resoan of that is the variables do not need to be classified as I (1) and I (0) (Sharifi-Renani, 2008: 4). The main advantage of the ARDL model is that even if the variables are I (1) or I (0), cointegration testing can be performed and reasonable results can be obtained (Pesaran & Pesaran, 1997; cited in Paudel & Jayanthakumaran, 2009: 137). However, the ARDL model cannot be applied in cases where the variables are integrated from the 2nd order and higher (Çağlayan, 2006: 427). Another important advantage is that it can be applied to small samples (Kamaruddin & Jusoff, 2009: 100).

CHAPTER 3
FINDINGS

Empirical findings are based on the estimation of the model with the ARDL approach Least Squares (Eck) estimator. Therefore, the basic assumptions of the Eck are also tested in ARDL modeling. For this reason, it is necessary to first test whether the series of variables contain unit roots. For time series to be studied, series must be stationary in a scholastic process (Dickey-Fuller, 1979), and the stasis of a series can be systematically tested with unit root tests. If the series is not stationary, a prediction with the series will only apply to the period covered and will not cover other periods. If there are non-stationary series, they must be stationary by taking the differences. The results of the Augmented vertical Fuller unit none test for the series are shown in Table 2 below.

Accordingly, gold, dollar, OIL and PR variables in TCOVCASE and WCOVCASE i (0) are stable at 1% in i(1). For this reason, the ARDL model has been designated as the most effective model for the selected variables.

Table 2: Root Test Results for Variables

Variables	Unit Root Test Results		The Level of Cointegration I (0)		I (1)	
			t-Stats.	Prob.	t-Stats.	Prob.
GOLD	ADF test stats.		-1.825	0.683	-9.662	0***
	Test critical values	1% level	-4.082	-	-4.083	-
		5% level	-3.469	-	-3.470	-
		10% level	-3.162	-	-3.162	-
DOLAR	ADF test stats.		-1.617	0.776	-4.154	0.009***
	Test critical values	1% level	-4.097	-	-4.101	-
		5% level	-3.476	-	-3.478	-
		10% level	-3.166	-	-3.167	-
OIL	ADF test stats.		-1.575	0.794	-9.690	0***
	Test critical values	1% level	-4.082	-	-4.083	-
		5% level	-3.469	-	-3.470	-
		10% level	-3.162	-	-3.162	-
PR	ADF test stats.		-2.527	0.315	-8.779	0***
	Test critical values	1% level	-4.082	-	-4.083	-
		5% level	-3.469	-	-3.470	-
		10% level	-3.162	-	-3.162	-
TCOVCASE	ADF test stats.		-9.296	0***	-	-
	Test critical values	1% level	-5.348	-	-	-
		5% level	-4.860	-	-	-
		10% level	-4.607	-	-	-
WCOVCASE	ADF test stats.		-4.578	0.002***	-	-
	Test critical values	1% level	-4.095	-	-	-
		5% level	-3.475	-	-	-
		10% level	-3.165	-	-	-

Note: * 10% refers to the level of statistical significance, * * 5% refers to the level of statistical significance, and * * * 1% refers to the level of statistical significance.

Table 3: ARDL Short-Term Model Results

Variable	Coefficient		Std. Error	t-Statistic	Prob.*
GOLD(-1)	0.503***		0.110	4.586	0.000
DOLAR	-18.997**		8.654	- 2.195	0.032
OIL	5.571**		2.744	2.030	0.046
PR	-6.065**		2.718	- 2.232	0.029
WCOVCASE	0.000***		0.000	3.993	0.000
TCOVCASE	-0.012***		0.003	- 3.935	0.000
TCOVCASE(-1)	0.011***		0.003	3.796	0.000
GOLD(-2)	0.265***		0.096	2.745	0.008
C	214.340 ***		79.127	2.709	0.009
R-squared	0.954	Adjusted R-squared			0.948
F-statistic	169.803	Prob (F-statistic)			0.000
S.E. of regression	3.662	Durbin-Watson stat			2.106

Note: * 10% refers to the level of statistical significance, * * 5% refers to the level of statistical significance, and * * * 1% refers to the level of statistical significance

In order to determine the effects of Covid-19 and other arguments on gold prices, information criteria are first used in determining delay values in ARDL modeling. As in Table 4, Akaike Information Criteria (AIC) was used in the study and as the ARDL Model (1, 0, 0, 0, 0, 1) references. The model includes election results in line with the AIC. At the same time, cusum and CUSUM Squares tests were applied to test the presence of structural fracture for the selected model. Accordingly, structural breakage cannot be mentioned within the time period in which the model is installed.

Statistically meaningless delays in short-term relationships were excluded from the model and the results in Table 3 were obtained. Accordingly, it was considered appropriate to exclude the delays of dollar, OIL, PR and WCOVCASE variables from the model. Also belonging to the dependent variable 2 in order to determine the effect of the delay value on gold prices outside the model of Covid-19 and other arguments, information criteria are first used in determining the delay values in ARDL modeling. In addition, deviations from the basic assumption were tested for the predicted model. Accordingly, given the adjusted R2 value, the arguments included in the model have the power to explain gold prices at about 95%, with a 1% significance level. In addition, we see that the dependent variable's own delay values also affect gold prices. During the period covered, it is observed that both levels of delay of gold are affected at the 1% significance level and positively. The dollar variable has a negative relationship with gold prices at 5%. In other words, since the dollar is seen as an alternative investment tool for gold from the point of view of investors, it is a normal result that the direction of the relationship between them is negative. Looking at the results between OIL and gold, another variable, it seems that it is positive at the level of 5%. This means that the increase in fuel prices increases the price of gold. Analysis results show a negative relationship between PR and gold at 5%. Investors turn to gold, where they are a haven as interest rates fall or evaluate their savings by investing in interest as gold prices fall. Looking at the relationship between the number of Covid-19 cases in Turkey and gold prices, it is observed that there is a negative relationship between TCOVCASE and GOLD at the level of 1%. But it is not a result that is expected to emerge from this model. As the number of cases increases, gold prices are also expected to increase, as investors are expected to increase demand for gold due to the fear factor. But the relationship of this variable with the delay value was positive

But the relationship of this variable with the delay value was positive. In other words, the increase in the number of cases is driving up gold prices. The reason for this is that the number of cases is T.C. It is thought to have been announced by the Ministry of Health earlier in the evening, and therefore its impact on gold prices. But between gold prices and WCOVCASE, the world Covid-19 case number variable, there are no significant relationships for delayed values, and there is a positive relationship with this variable at the level of 1%. This, on the other hand, supports the fact that the delayed values of the number of cases in Turkey are positive. Because of the time difference caused by the global structure of the world, world case numbers can be seen instantly by investors before the markets close, and they also reflect positively on gold prices in the period under consideration. In summary, as the number of cases of Covid-19 in Turkey and the world increases, investors see gold as a safe port, as in the past, demand for gold increases, and gold prices are positively affected by this increase.

Table 4: ARDL Model Selection Results

..	LogL	AIC*	BIC	HQ	Adj. R-sq
(1, 0, 0, 0, 0, 1)	-198.980	5.546	5.824	5.657	0.948
(1, 0, 0, 0, 1, 1)	-198.192	5.552	5.861	5.675	0.948
(1, 0, 0, 1, 0, 1)	-198.293	5.554	5.863	5.678	0.948
(1, 0, 0, 1, 1, 1)	-197.470	5.559	5.899	5.695	0.948
(2, 0, 0, 0, 0, 1)	-198.900	5.571	5.880	5.694	0.947

The specification of the model is shown in Equation (2).

$$Gold_t = \alpha\ \beta_1 GOLD_{t-1} + \beta_2 GOLD_{t-3} + \beta_3\ DOLAR_t + \beta_4 OIL_t + \beta_5 PR_t + \beta_6 WCOVCASE_t + \beta_7 TCOVCASE_t + \beta_8 TCOVCASE_{t-1} + \varepsilon_t \quad (2)$$

A basic assumption of OLS method for the model errors should have a normal distribution and normality were tested for the normality test are being tested (Jarque-Bera=0,899692) heteroskedastis the White test was applied for the assumption in (Prob. Chi-Square (40) 0.1445). The LM test was used to test the autocorrelation (probe. F (7.59) 0.2357). At the same time, the Wald test tested the significance of the parameters related to the variables contained in the model together (F-statistical 63946.67). Accordingly, the ARDL model was found appropriate in terms of basic assumptions. After determining the short-term relationship, it was concluded that the relationship was peer-integrated as a result of testing whether errors related to the model, which is a preliminary test for the existence of a long-term relationship, contained a unit root. The results of the Bound test developed for this are also included in the table. According to the results in the table, since the statistical value of the Model F is greater than the values of I(1), it was found to be significant at the level of 2.5%. In other words, it is possible to say that there is a joint relationship between variables.

Table 5: Bound Test Result

	Critical Value Bounds	
Significance	**I(0) Bound**	**I(I) Bound**
10%	2.080	3.000
5%	2.390	3.380
2.5%	2.700	3.730
1%	3.060	4.150
F-statistic	4.110***	
k	5.000	

Note: * 10% statistical significance, ** 5% statistical significance, *** 2.5% statistical significance ****1% refers to the level of statistical significance**.**

Impact of Covid-19 Pandemic on gold prices: ARDL analysis

Table 6: Long-Term Regression and ECM Results

Error Correction Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
D(DOLAR)	-12.911	10.736	-1.203	0.234
D(OIL)	5.870	3.922	1.497	0.139
D(PR)	-2.461	3.449	-0.714	0.478
D(WCOVCASE)	0.000**	0.000	1.782	0.079
D(TCOVCASE)	-0.012***	0.002	-5.271	0.000
CointEq(-1)	-0.512***	0.091	-5.611	0.000

Long Run Regression				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
DOLAR	-38.203**	17.222	-2.218	0.030
OIL	11.203**	5.190	2.159	0.035
PR	-12.196**	5.055	-2.413	0.019
WCOVCASE	0.000***	0.000	4.005	0.000
TCOVCASE	-0.001	0.000	-1.299	0.198
C	431.040***	152.693	2.823	0.006

Note: * 10% statistical significance, ** 5% statistical significance, *** 2.5% statistical significance**.**

In addition, according to the results of the long-term relationship (Table 6), there is a co-integrated negative correlation between gold prices and the OIL variable, statistically positive at the 5% significance level, and with the DOLAR and PR variables at the 5% significance level. According to the table, the long-term model specification is that:

$$\Delta GOLD_t = \beta ECM + \delta_1 \Delta DOLAR_t + \delta_2 \Delta OIL_t + \delta_3 \Delta PR_t + \delta_4 \Delta WCOVCASE_t + \delta_5 \Delta TCOVCASE_t + \varepsilon_t \quad (3)$$

The model containing the error correction factor according to the predicted model is shown in Equation (4). Accordingly, the model's long-term capture rate is 51% when moving from short-term relationship to long-term. Dollar, OIL and PR

variables included in the model were statistically meaningless, while other variables were significant.

$$\Delta GOLD_t = -0{,}512ECM - 12{,}911\Delta DOLAR_t + 5{,}870\Delta OIL_t - 2{,}461\Delta PR_t + 0{,}000045\Delta WCOVCASE_t - 0{,}012\Delta TCOVCASE_t + \varepsilon_t \quad (4)$$

Compared to the short-term ARDL forecast results, it was observed that the delayed values in the long-term relationship model (5) were not included, the relationships were in the same direction as the short-term, but the tcovcase variable, which was significant with the first delay in the short-term, was not statistically significant on gold prices in the long-term. In addition, it has been observed that the effect of the WCOVCASE variable on gold prices is higher in the long period compared to the short period.

$$GOLD_t = 431{,}040 - 38{,}203DOLAR_t + 11{,}203OIL_t - 12{,}196PR_t + 0{,}00013WCOVCASE_t - 0{,}001TCOVCASE_t + \varepsilon_t \quad (5)$$

In addition , according to long-term relationship results, it was found that there was a statistically positive 5% significance level between gold prices and OIL variable and a negative 5% significance level with dollar and PR variables.

CONCLUSION

Analysis in a study conducted to measure the impact of the Covid-19 pandemic on gold prices. It was estimated using the ARDL model with daily data from - 08.04.2020. In the study, where gold prices (GOLD) were considered as a dependent variable, Covid-19 Turkey case number (TCOVCASE), Covid-19 World Case Number (WCOVCASE), US Dollar rate (dollar), policy interest (PR), gasoline pump prices (OIL) arguments were used. ARDL model according to Akaike information criteria (1, 0, 0, 0, 0, 1) designated as. According to the results of the short-term ARDL model, the arguments included in the model have the power to explain gold prices at about 95%. In addition, we see that the dependent variable's own delay values also affect gold prices. During the period covered, both levels of gold delay appear to be positively affected. The dollar variable has a negative relationship with gold prices. In other words, since the dollar is seen as an alternative investment tool for gold from the point of view of investors, it is a normal result that the direction of the relationship between them is negative. Looking at the results between OIL and gold, another variable, it seems that the direction of the relationship is positive. This means that the increase in fuel prices increases the price of gold. Analysis results show a negative relationship between PR and gold. Investors turn to gold, where they are a haven as interest rates fall or evaluate their savings by investing in interest as gold prices fall. Looking at the relationship between the number of Covid-19 cases in Turkey and gold prices, it is observed that there is a negative relationship between TCOVCASE and GOLD. But it is not a result that is expected to emerge from this model. As the number of cases increases, demand for gold prices is expected to increase, while gold prices are expected to increase. But the relationship of this variable with the delay value was positive. In other words, the increase in the number of cases is driving up gold prices. The reason for this is that the number of cases is T.C. It is thought to have been announced by the Ministry of Health earlier in the evening, and therefore its impact on gold prices. But there are no significant relationships between gold prices and WCOVCASE, the world Covid-19 case number variable,

for delayed values, and there is a positive relationship with this variable. This, on the other hand, supports the fact that the delayed values of the number of cases in Turkey are positive. Because of the time difference caused by the global structure of the world, these data can be seen instantly by investors in Turkey before the markets close, and its impact on gold prices in the period discussed is positively reflected. In summary, as the number of cases of Covid-19 in Turkey and the world increases, investors see gold as a safe port, as in the past, demand for gold increases, and gold prices are positively affected by this increase.

According to the long-term ARDL forecast results, it was observed that the relationship is in the same direction as the short-term, but the tcovcase variable, which is significant with its first delay in the short-term, is not statistically significant on gold prices in the long-term. In other words, a joint relationship between the number of Covid19 cases in Turkey and gold prices could not be determined. But it is possible to say that there is a uniform relationship between the number of World Covid-19 cases and gold prices. It has been observed that the effect of the WCOVCASE variable on gold prices is higher over the long period compared to the short period. In addition, according to the results of the long-term relationship, it was found that there is a positive relationship between gold prices and the oil variable, and a negative relationship between the dollar and PR variables. As a result, it is possible to say that the Covid-19 pandemic has built a fear on investors and that the demand for gold has increased due to this fear, resulting in a positive interaction on gold prices with the increase in demand. In other words, investors continue to look at Gold as a haven in Pandemic cases, as in economic crises or extraordinary natural events from the past to the present.

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