The Sensitivity of Borsa Istanbul Banks Index Growth to Exchange Rates, Oil and Gold Price Changes

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ABSTRACT

In recent years, due to a number or financial and political crises the Turkish economy has been marked with an increasing economic instability. Oil, Gold and the Turkish Lira to dollar exchange rate have exhibited increasing volatility as well in these years. Since banks are considered key actors for every economy, in this thesis, the sensitivity of the Turkish Lira to dollar exchange rate, global oil and gold prices are examined relative to the Turkish banks index growth (BISTBANKS). To investigate this relationship, the method of Ordinary Least Square estimation is used. Weekly data for the BISTBANKS Index, USD/TRY, oil and gold prices are used in this analysis over the period of 2016-2018. The empirical results obtained from this research demonstrate that the Turkish Lira to the dollar exchange rate and oil have significant effect on BISTBANKS Index growth, while the influence of gold is insignificant. This study suggests to shareholders of Turkish banks to sell their shares when USD/TRY increases and buy when it decreases. In addition, in case of world boom economy, investors may invest in Turkish banks when global oil price inclines and vice versa.

Keywords: exchange rate, oil, gold, BISTBANKS index.

ÖZ

Son yıllarda, bir dizi finansal ve politik krizler nedeniyle, Türkiye ekonomisinde ekonomik istikrarsızlık başlamıştır. Petrol, Altın ve Dolar/TL döviz kurunda da bu yıllarda artan dalgalanmalar sergilemiştir. Bankalar her ekonominin kilit aktörleri olarak kabul edildiğinden, bu tezde Türk bankalarının endeks getirisinin (BİSTBANKS) Dolar/TL kuru, küresel petrol ve altın fiyatlarına olan duyarlılığı incelenmiştir. Bu ilişkiyi araştırmak için, Ordinary Least Square metodu kullanıldı. BISTBANKS Endeksi, USD/TL, petrol ve altın fiyatları için 2016-2018 döneminde haftalık veriler kullanılarak analiz yapılmıştır. Bu araştırmadan elde edilen ampirik sonuçlar, Dolar/TL döviz kuru ve petrol fiatının BISTBANKS Endeks getirisi üzerinde önemli etkiye sahip olduğunu, altın fiatı etkisinin ise önemsiz olduğunu göstermektedir. Bu çalışma, Türk bankalarının hissedarlarının, USD/TL yükseldikçe aldıkları hisseleri satmalarını, USA/TL düştükçe ise hisse almalarını önermektedir. Buna ek olarak, dünya ekonomisinin çok hızlı geliştiği zamanlarda ise petrol fiyatı düştüğünde yatırımcılar Türk bankalarına yatırım yapabilirler.

Anahtar Kelimeler: döviz kuru, petrol, Altın, BISTBANKS Endeksi

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Chapter 1

INTRODUCTION

1.1The aim of the research

This research aims to analyze the sensitivity of Borsa Istanbul Banks (BISTBANKS) Index growth against changes in USA dollar/TL exchange rate, crude oil and gold prices over the period of 2016-2018. The impact of the changes in exchange rates, oil and gold price on stock returns is very important however, there are only a few studies that focused on this issue especially in the emerging markets. Yet emerging countries' stock markets have higher volatility than the developed countries that deserves further research on this subject. Therefore, our research will fill a gap in the literature by testing the sensitivity of BISTBANKS' growth to the aforementioned variables in Turkey, an emerging market country.

According to Bloomberg, Turkey is the second attractive emerging market country in 2018 following Mexico (www.bloomberg.com). A set of metrics have been used by Bloomberg to measure the attractiveness of the emerging markets. These include yields, asset valuation and the current account position. In recent years, Turkey went through a handful of political issues which affected its financial markets and nominal exchange rate. Since the beginning of 2016 the exchange rate soared from 2.9 to over 4.5 USD/TRY in mid-2018. During this period, oil had been in an uptrend. In January 2016, oil unbelievably reached to its lowest since October 2003 to closely $28 per barrel and created a new pick at $72 in May 2018. Meanwhile, Gold jumped from

$1055 to $1372 per ounce from Jan to July 2016. Then it declined to $1123 in December 2016. Afterwards, it started an uptrend and approached to $1363 per ounce in April 2018. On the other hand, BISTBANKS index increased from 115282 in Jan to 143966 in April 2016 and it moved in this range until Jan 2017. Then it started the uptrend and created a new pick at 193053 in Feb 2018 and went down to 157272 by April 2018. Hence it is worth to conduct this research to understand how the Turkish financial markets reacted to this change.

1.2 Background

Financial markets connect economic players who are in need of resources and those who have excessive financial sources. In this framework, "it is compulsory for the financial intermediates as third parties to provide effective fund transfer and reduce the associated risks" (Dinçer and Hacioglu, 2009, p. 33-35). After the globalization, the effects of the financial intermediaries on the financial system are better realized. When compared to the first world countries, the financial sector in Turkey is in the development stage despite its small scale.

Despite that, the financial sector in Turkey is above the average scale compared to other developing countries. This means that Turkish financial sector is gradually but continuously increasing in scale year by year. In terms of total asset to GDP, deposit money in banks was 60.6 times larger than GDP in 2010 and continuously increased to 70.6 at the end of 2015. Non-bank financial institutions, insurance companies and pension funds' assets were 3.28, 3.03 and 1.04 in 2010 and they increased to 4.32, 4.09 and 2.05 in 2015 respectively. On the other hand, total assets of Turkish central bank to GDP decreased from 0.94 in 2010 to 0.54 in 2015 (fred.stlouisfed.org). Considering asset size, the assessments show that by 2010, this sector has a structure comprising

79 percent banks, 11 percent assets of Turkish Republic Central Bank, six percent financial leasing and factoring, bonds and stocks etc., three percent insurance companies, one percent personal retirement pension. So it can be said that the banking sector is the biggest player in terms of asset size in Turkish financial sector (BRSA, 2010, p. iii-iv).

Banks are a vital part of a country's economy. Some may claim that banks do not create any new wealth, but they can boost production of wealth, its distribution, in addition to its consumption and exchange through transactions, such as lending and borrowing, made in and by banks. Therefore, their role in developing the economy and their efficiency is undeniable. Being an important actor, changes in the banking sector need to be analyzed in advance to investigate the volatility that exists in the financial sector.

Recently, financial markets have become more liberal, which in turn they have been exposed to many sources of risks. Exchange rate risk is one of the most important risks. It may affect banks' income associated with their interest income. For instance, in Turkey, borrowing USD and lending Turkish Lira while the exchange rate, USD/TRY is going up, will cause banks to lose and vice versa. In the case when borrowers borrow in USD, if the rate inclines, many borrowers may be unable to pay back their loans which causes an increase in banks non-performing loans. Despite, exchange rate influences banks on several aspects, only its effect on banks stock price is discussed in this research.

How exchange rate movements can affect banks' stock returns has made different parties interested. The interested parties may include bank managers, regulatory

authorities, academic communities and investors. This is due to the fact that since several major bank crisis has been said to be because of undesirable movements in exchange rates.

There are numerous models and hypotheses that aim at explaining the sensitivity of stock returns and bank stock returns to exchange rate changes. Firstly, Merton (1973) devised a model called the intertemporal capital asset pricing model (ICAPM). According to this model, the interest rate and oil price risk may be considered as additional market factors. This is because interest rate changes may contribute to a change in the investment opportunity set. In addition, oil price movements may have a considerable effect on the balance of payments, especially for countries who import oil, which leads to an impact on exchange rates. Thus, due to the existence of such risks, investors ask for compensatory options. Furthermore, the theory of Arbitrage Pricing (APT) could help in point out the role of interest rate and exchange rate risks as possible factors affecting the equilibrium of bank stock prices (Sweeney & Warga, 1986). In equilibrium, there are two elements that have important effect on the stocks of financial organizations: interest rate (Yourougou, 1990) and exchange rate sensitivities.

In order to avoid or discount the amount of risks banking institutions are exposed to by exchange rate changes, they can involve in different off-balance-sheet projects and adopt constructive risk management methods. Nevertheless, such institutions in countries with emerging economies are more in jeopardy because of their lack of experience and skill in such methods and techniques. Therefore, such countries encounter financial crises more frequently. Thus, investigating the exchange rate exposures of banks in these countries are of great importance because the findings will

serve such emerging countries to achieve financial stability and formulate strategies for banks and regulatory institutions.

Crude oil price can have an impact on the economies via three principle channels: to start with, crude oil price increment has a significant impact on inflation as these movements increase production costs, which in turn shift the supply curve. In addition, oil price changes can significantly affect balance of payments, especially countries that import oil, leading to an impact on exchange rates. Lastly, price movements have an impact on the total amount of consumption value of households, leading to a substitution effect; which is a fall in demand resulting from the rise in prices and vice versa. Plus, given that a country's balance of trade and inflation both have significant roles in setting exchange rates for the medium and long term periods, the movement of oil prices could also be a plus to the adjustment of this long-term process. On the other hand, short term effects are formed under the influence of financial markets.

Given that the pricing of oil is done in terms of US Dollars (USD), the deduction is that changes in oil prices will directly affect the USD exchange rates. On the other hand, such movements in crude oil prices are liable to impact the stock markets as well by channeling various forms of expectations. Oil price changes cause changes in costs of production in the relevant sectors, leading to changes in the prices of related stocks. More to say, unstable movement in the price of crude oil could affect the investment and consumption level, which can in turn cause overall level of stock prices to go up or down, via an impact on earnings expectations. Furthermore, such impacts might be more severe in sectors that are related to crude oil markets. Moreover, the relationship between crude oil and financial markets leads to inconsistency in financial markets

causes an effect on financial flows to commodity markets, which causes commodity price to change.

Of recent, discussions have often been held surrounding the direction and nature of the relationship between exchange rates, crude oil prices and stock indices. So far, the main expectations are such that there is a negative relation between the price of crude oil and the rate of exchange in dollar denominations. Worth mentioning, is the belief that demand pulled movement in oil prices, from factors such as changes in economic growth, have a positive relation with stock prices, and whereas supply pulled movement in stock prices from factors such as conflicts in exporting regions bare a negative relationship

Oil price changes can have an effect on both developed and developing countries via the above-mentioned channels. However, such changes are various depending on the country's specifications. Import- or export-dependent countries, though, are more exposed to the effects of oil price changes.

The impact that oil prices and exchange rates have on the stock returns is very important but there are only a few studies that have focused the nexus among crude oil prices, exchange rates and bank stock returns, considering the emerging markets' situations, specifically their volatility. Nevertheless, most studies focused on developed markets. Thus, this study mainly aims at contributing to the existing literature by unfolding via means of investigation the level of bank stock returns sensitivity to exchange rate, oil and gold price, as a control variable, changes using Turkey a major emerging economy as case study. Turkey's banking sector was not affected much from the 2007-2010 global financial crises. Similar to other emerging

market countries, Turkey's economy is characterized by its high interest rates and sharp fluctuations in its exchange rate. Banks' capital has been eroded due to the maturity gaps and short positions in foreign exchange holdings of banks. Therefore, the purpose of this research is to analyze the sensitivity of the BISTBANKS index growth to exchange rate, crude oil and gold price movements over the period 2016-2018, using standard OLS method.

1.3 Data and methodology

In this research, time series data is used to conduct the analysis. Weekly close quotes of BISTBANKS, USD/TRY, oil and gold are taken from Thomson Reuters DataStream starting from January 2016 to March 2018. Then, the raw data is transformed to find the percentage change of each variable. Since the aim of the research is to investigate the sensitivity of few macroeconomic variables on banking industry index, the dependent variable for this research is the return of BISTBANK Index and the independent variables are namely, change in nominal exchange rate (USD/TRY), changes in oil prices and gold prices. These variables are abbreviated as ΔXBANK, ΔUSD, ΔOIL and ΔGOLD respectively. To achieve our aim, we used the standard OLS regression method. In addition, some other tests also are conducted for the robustness of the model. All the tests are done using E-VIEWS 9 software.

1.4 Disposition

Chapter 2 reviews the studies done by other researchers about the influence of macroeconomic variables on stock market return. Chapter 3 discusses the data and methodology used in this research. Chapter 4 presents the empirical results and discusses the findings. Finally Chapter 5 concludes the thesis by summarizing the findings.

Chapter 2

LITERATURE REVIEW

2.1 Exchange rate

There are two main theories which attempt to demonstrate how exchange rate and stock prices are related. These are Goods Market Approach and the Markowitz Portfolio Theory. Dornbusch and Fischer (1980) propose that the Goods Market Theory is based on the main principle of the economic orientation of a country in terms of export and import. For counties which are export-dependent, local currency appreciation exacerbates export competitiveness, which leads to the reduction of firms' earnings and undermines their performance causing a negative influence on the domestic share market. For countries which are import-dependent, conversely, an exchange rate appreciation of the local currency causes a positive effect on domestic stock prices by decreasing the production costs.

The main usage of the Markowitz Portfolio Theory (Markowitz 1952, 1991) is to interpret why portfolios with high returns should be reassessed in cases when exchange rates go up or down. The movement of exchange rate influence foreign investors' rates of return in the domestic stock market. It also affects the rate of return of domestic investors with portfolios diversified overseas. Depreciation causes portfolios to move from domestic assets (for instance, stocks) to foreign assets, due to the reductions in returns for foreign investors caused by depreciation when the capital is converted to the domestic currency. For the domestic investors with international diversification,

depreciation leads foreign stocks to be costlier, which means turning to domestic assets, by which the domestic stock prices increase. There is an exact opposite effect when the exchange rate appreciates. Therefore, basically the exchange rate's impact on the share market may be either positive or negative. Thus, it is no surprise that the empirical literature findings about the effect of the real exchange rate on stock prices are mixed (Nieh and Lee 2001). Nieh and Yau (2010) study Chinese market and report that there is not any short-term causal relation between the yuan appreciation and stock prices in that country. Despite that, Chancharoenchai et al. (2005), find that some macroeconomic variables can have quite robust explanatory power for monthly excess returns.

The bulk of studies conducted on bank stock returns employ different methodologies in accessing the individual effects of interest and exchange rates on the returns of bank stocks, thus giving rise to different empirical results. Flannery (1981) adopts cash flow approach for US bank stocks and find that interest rate variations did not affect them as such changes had no significant effect on the profits and costs.

Some early empirical studies conducted on the sensitivity of banks' stock returns to interest rates were by Stone (1974), Lloyd and Shick (1977), Chance and Lane (1980), Lynge and Zumwalt (1980), Flannery and James (1984), Booth and Officer (1985), Scott and Peterson (1986), and Bae (1990). In addition to bank stock returns when market and interest rate factors are included on the return of bank stocks, forming a two index factor model while assuming that the error terms have a constant variance, it can be reported that the findings were not similar in terms of the direction and magnitude of the effect. For instance, the results of the study done by Lynge and Zumwalt (1980), Flannery and James (1984), Booth and Officer (1985), Scott and

Peterson (1986), and Bae (1990) challenge the findings of Lloyd and Shick (1977) and Chance and Lane (1980), as they do not provide a strong evidence of interest rate impact on the returns generated by financial institutions stocks. In general, researchers that yielded significant results favored the argument of exchange rates negatively affecting the conditional return of bank stocks (Lloyd & Shick, 1977; Chance & Lane, 1980). On another note, bank stock returns are observed to be more sensitive towards market returns as compared to interest and exchange rate, thus demonstrating the key role of market returns the dynamics of the conditional returns on bank stocks (Bae, 1990). Irrespective of the previous mention, still is the observation that exchange and interest rate movement are key determinants of the volatility of bank stocks.

More recent studies assert similar findings to previous ones in that the sensitivity of banks' stock returns portrays a negative relationship to changes interest rates (Kasman,Vardar & Tunç, 2011; Jaroenwiriyakul & Setthapramote, 2017; English, Van den Heuvel, & Zakrajšek, 2018). Both Kasman et al. (2011) and Jaroenwiriyakul and Setthapramote (2017) used the GARCH methodology to model the volatility of bank stock returns in relation to that of interest rates and exchange rates, they found that bank interest rates significantly but negatively affected bank stock returns. In the same light, English et al. (2018) equally found and existing inverse relation between interest rates and stock market returns but added that large maturity gaps significantly increased the impact of this negative reaction on stock returns.

Although the literature covering interest rates is deemed abundant, a small number of researches covering foreign rate sensitivity towards bank stock returns have also been carried. When we consider that abrupt changes in exchange rates could potentially have a direct impact on banks via the translation of gains or losses dependent on their

net foreign exposure, it is but rational to assume the importance of exchange rates risk in determining the returns generated from bank stocks (Christoffersen & Pan ,2018). Attention towards the impact exchange rates exercised on bank stock returns where initiated by Grammatikos et al. (1986) and Chamberlain et al (1997) who investigated the exposure of American banks to exchange risk and found it to be significantly of concern. Again, a combination of monthly and daily data was used by Chamberlain et al. (1997) in comparing the sensitivity American bank stocks to exchange rate movement relative to the Japanese banks, they found that as compared to Japan the U.S stocks of banks displayed a higher sensitivity to exchange movements.

The common trend in past was for most studies to examine either interest or exchange rate movements on bank stock returns, nevertheless some studies incorporated a three factor model that includes a combination of the market, exchange and interest rates in performing their analysis (Choi et. al, 1992; Wetmore & Brick, 1994). In both studies, Choi et al. (1992) and Wetmore and Brick (1994) analyzed how U.S bank stock returns would react to the three factor model. Both estimations were similar to the exception that Wetmore and Brick (1994) assumed a constant variance in the residual terms. Choi et al.'s (1992) results provided evidence which were more robust for the impact of interest rate sensitivity as compared to exchange rate sensitivity, though these results were arguable according to Wetmore and Brick's (1994) report. This time using a sample of Korean banks, Hahm (2004) also used the same three-factor model to inquire the return generating process of bank stocks and found that in the case of Korea bank stock returns were sensitive towards all three factors.

Despite the fact that there are many studies conducted on the banks in the developed world, the amount of research carried out in emerging countries has been limited. Hooy

et al. (2004), for instance inquired on how sensitive Malaysian bank stock returns were to interest and exchange rates during the 2008 Global Financial Crisis using the GARCH methodology. They found that during the pre and post period of the crisis, the sensitivity to these factors were minimal despite the fact that there was an increase in the amount of the risk exposure of Malaysian banks after the emergence of forced banking consolidation program and the capital control policy.

In Turkey, a few researchers have inquired on how some major macro-economic factors including exchange and interest rates related to the variability of stock prices. Akar (2011) inquired on the nexus between stock returns, foreign exchange and gold for Turkey using a monthly frequent data form the year 1990 to 2010. By specifying the model as a DCC-GARCH (1, 1), Akar (2011) noticed that the correlation between the price return of each asset varied for different periods over the time investigated. For instance, from 1990 to 2001 (the first quarter), a positive and low correlation of 0.03 between gold and stock returns was recorded, whereas this increased and became negative in the years after 2001.In addition, Muduradoglu and Kivilcine(1996) investigated the long-term association between the Borsa Istanbul Index, inflation, exchange rate to the US dollar, interest rates and money supply for the period 1986-1993. The Granger causality and Johansson cointegration analysis revealed that stock prices positively related to money supply but negatively to inflation, exchange and interest rates.

Gay (2008) extended the study on stock price movements relative to oil price, exchange rates and other macro-economic variables by investigating a pool of four developing countries including China, India, Russia and Brazil. Using a panel analysis, he concluded by saying that the relationship between oil prices, exchange rates and

stock market price movements illustrated no significance. His reasoning for such findings was that, other home and external (overseas) factors such as the balance of trade, inflation and interest rates overseas could have been at work for such an outcome though he recommends further investigation on this research.

Another study worth mentioning was that of Gan et al (2006), who investigated the long run relationship between a mix of New Zealand's (NZ) macro-economic factors and NZ's stock market index from the period of 1990-2003 with monthly data. Using the Johansen co-integration, the results revealed that there is a long run relation between the stock market index and the macro economic factors namely; GDP, short and long term interest rates, money supply and retail oil prices. Also, by means of granger causality tests no causal direction was found from the NZ's stock prices to the variations in economic variables. A plausible explanation was due to the smaller size of stock market of New Zealand in comparison with the developed countries.

Tabak (2006), uses Granger causality test to investigate the link between exchange rate and stock prices in Brazil economy. It is found that there is no long-term relationship between the variables under study. Banny and Enlaw (2000), also, investigate the relationship between the Malaysian ringgit in relation to the US dollar and stock prices in Kuala Lumpur Stock Exchange (KLSE). It is found that there is a negative relationship between exchange rate and KLSE stock prices. Soenen and Hennigar (1988), find a significant and negative relationship between stock prices and the US dollar.

Adjasi et al. (2008), investigate the consequences of the fluctuations in exchange rate on the Ghanaian stock market. In this study, data for the period of 1995 to 2005 is used

to explain this impact. The results indicate that a negative relationship exists between exchange rate and the Ghanaian stock market returns. They used the GARCH method. Kuwornu (2012) studies the impacts of variations in some certain macroeconomic factors, including consumer price index, exchange rate, 91-day treasury bill rate, and crude oil price, on the Ghanaian stock market. He uses monthly data for the period of 1992-2008, using the Johansen co-integration test to analyze the data. The results show that there is a significant long-term equilibrium relationship between the macroeconomic variables under study and stock returns in the country of Ghana.

2.2 Oil

There is a great body of research on the impact of oil price changes on stock prices and it can be categorized in two different levels: the market level or the industry level.

With regard to the market level, there is a study conducted by Jones and Kaul (1996). These authors use quarterly data for the period between 1947 and 1991 to investigate the stock market on oil prices, it came to their notice that for the U.S and Canada there existed a negative relationship between the variables under investigation.. In comparison, over the 1980s, Huang et al. (1996) investigated on the relationship between US stock returns and future prices. They indicate that there is no correlation between future returns and their respective stocks, with the exception of the oil industry companies. Furthermore, the relationship between oil and stock prices, industrial production and short-run interest rates were investigated by Sadorsky (1999) using the unrestricted vector autoregressive (VAR) model. Unlike Huang et al. (1996), Sadorsky's (1999) research concludes in favor of oil prices been a significant factor in explaining the existing variations in the U.S stock markets. In a similar respect, Papapetrou (2001) analyzed the interaction between the quoted prices on the Greek

stock market, oil prices, interest rates, employment and economic activities and concluded that the variations in oil prices have an important role in determining the movements of stock market prices.

Although just a few studies have been conducted at the industry level, more research aimed at filling this gap has been increasingly carried as the years go by. For instance, Faff and Brailsford (1999) pioneered studied at the industrial level by investigating the effect of oil price movements on stock prices for various industries listed on the Australian stock market. They found that the responses to oil movements varied as per industry, for example, companies with diversified resources operating in the oil and gas sector positively aligned with oil price movements whereas it was negative for the transport, packaging and paper industries. A similar study investigated the correlation between oil price movements and the stock index of the Oil & Gas industry in Canada and found it to be positive (Sadorsky, 2001). Other researchers such as Hammoudeh and Li (2005), again found almost identical results with the exception that in the case of USA, the transportation industry faced adverse effects in the event of a rise in oil prices. Furthermore, using different methodological approaches, Aggarwal et al. (2012), argued that the stability of revenues arising from the transportation industry was heavily distorted when oil prices rose. Worth mentioning, is a comprehensive study performed on a panel of 35 countries covering the oil and gas industry, the results illustrated a positive relation for a major part of the industry with the variation in oil prices been of higher value for developed countries contrast to emerging ones (Ramos & Veiga, 2011).

Sector level studies are mostly focused on the Oil & Gas industries. However, there are some other studies that investigate other sector categories. As an instance, Nandha

and Faff (2008) over a 22 years period investigated a number of sectors including the banking sector to inquire about how these sectors were affected by oil price movements and found that in the exception of energy related and mining sectors, all the other responded negatively. In addition, Scholtens and Yurtsever (2012) sampled 38 industries across Europe to investigate each industry's reaction to oil price changes. They found that the only industry benefitting from oil price increases was the Oil & Gas sector, whereas they report that the sensitivity in the other industries is quite weak. In addition, around 50% of the industries appear to have a positive reaction towards when the oil prices decrease.

Generally, the literature mainly focuses on developed countries data, mostly in the US, which has a very distinctive economy compared to other countries, which makes comparisons faulty in the first place. Yet, recently there have been different studies conducted for the data of countries which have never been investigated. Such studies provided a more useful and realistic point of view regarding the conclusions made at global level. As an example, Hammouded and Aleisa (2004) investigated how stock prices of the member countries in the Gulf Cooperation Council (GCC), would respond to shocks in oil prices. They find that, just for the Saudi Arabia, there is a significant and positive relationship between the variables. In addition, Mohanty et al. (2011) furthered a step ahead of the study of Hammouded and Aleisa (2004) by segmenting their analysis to market and industrial levels. Their results ascertain that oil prices positively and significantly relate to stock market movements in the exception of Kuwait, an equal positive trend was observed at the industry level for a dozen of the twenty sampled industries. Similar results were supported by other studies surrounding

emerging economies (Basher & Sadorsky, 2006; Driesprong et al., 2008; Aloui et al., 2012).

The value at risk (VAR) analysis has been recurrent in literature for analyzing the stock market reaction to oil price movements. Using 13 European countries and the USA as sample, Park and Ratti (2008) analyzed the reactions of firm returns in response to oil price changes. One of these countries is Norway, which is an oil-exporting state, showed a positive reaction in firm returns when encountered increases in oil prices. Whereas, the US and 10 of the European countries (with the exception of Norway, Finland and the United Kingdom) showed an inverse reaction. Björnland (2009), concluded that the Norwegian economy benefits from higher oil prices after incorporating structural VAR in the analysis. His results show that a 10% increase in the oil prices leads to a 2.5% increase, in average, in the Norwegian stock market.

Most of the previously mentioned studies liken in that they treat the causal relation between variations in oil prices and the changes in stocks as one moving from oil to stock prices. Lee et al. (2012) checks this causality by means of Granger causality and VAR analysis for the monthly data of G7 countries. They conclude that the impact of oil price changes on the general index price of these countries is of no significance. Nonetheless, they find significant impacts when sector indices were analyzed. Sadorsky (1999) found no significance for the impact of movements in economic activities on oil prices, the study makes no furtherance in individually checking if changes in the stock market had an impact on oil prices

In recent years, an approach that has appeared to be of importance in such studies is the analysis of asymmetric effects. Sadorsky (1999) argues that asymmetric effects

accompany movement in oil prices because the sensitivity stock markets rise during positive changes in oil prices. Park and Ratti's (2008) study on the U.S. and Norway (which are both oil exporting countries) prove to be in line with Sadorsky (1999). For the other European countries included in the study (oil importing countries), some asymmetric effects evidence was found. In later studies, different researchers have stated that asymmetric effects exist in their market level analysis (Lee & Chiou 2011; Mohanty et al. 2011; Cunado & Gracia, 2014). A number of authors also confirm the presence of such effects in their analyses at the industry level (Ramos & Veiga, 2011; Arouri, 2011; Scholtens & Yurtsever, 2012). Industry level studies indicate that there are variations in asymmetry test results for various industries. The sensitivity of the Spanish stock market to oil price changes at the industry level are tested by Moya-Martínez et al. (2014) for the period between 1993 and 2010. They find that there is a limited oil price exposure, despite the fact that there are significant variations found for different industries which were weaker over the 1990s, when oil prices were stable and lower, and higher over the 2000s, when there was a positive effect.

Most empirical studies conducted have been in the aggregate or macroeconomic analysis at the market or industry levels. However, more recent studies have focused to investigate the impact of oil price variations on stock market at the company level, which is microeconomic. For instance, Narayan and Sharma (2011) provided a thorough company level analysis by making use of the GARCH estimation technique over a a sample of 560 U.S companies listed on the stock Exchange form 14 different sectors. They conclude that the impact of oil price changes is different for different sectors under study. Thus, the impact of oil price increases on transport and energy

sectors are positive, whereas for the other sectors oil price changes this impact is negative.

2.3 Gold

There are abundant studies regarding the impacts of gold prices. However, a few studies are considered helpful and, to contribute to this study, we mainly will mainly proceed with studies that elaborate on relationship between gold price and stock indices as presented below.

Mulyadi and Anwar (2012) adopt a probit economic model with the data for the period of 1997-2011 to investigate the relationship between gold prices and stocks, and also they compare investments on gold and stocks. They find that the benefit of gold investment is higher compared to stock investment. In contrast, Bhunia and Das (2012) performed a study in India to investigate the causal relationship between gold prices and stock exchange return adopting the Granger Causality test. Their findings indicate that the variables have an impact on one another, and gold prices change alongside stock prices during global financial crisis and afterwards. Additionally, the authors mention that Indians observed gold as an important investment, not just a luxury good. Gwilym et al. (2011) make an attempt to clarify how gold prices and gold stock index levels are related, and how this relationship can explain the benefits of future gold investment. The model used in their study could explain gold manufacturing companies stock values.

Furthermore, Bali and Cinel (2011) estimate the impact of gold prices on the ISE index using panel data analysis. Their work aims at investigating if there is any impact of gold prices on the ISE 100 Index, also whether this impact is positive or negative plus

its magnitude. To serve this aim, they used constant effect models and random effect models. The results show that gold price does not directly affect ISE 100 index, it is one of the parameters that explain the movements in the ISE 100 index, however. Despite that, Mishra et al. (2010), employed a granger causality test and found that there is causal relationship from gold prices to stock returns after investigating a time span of eighteen years (1991-2009), they also conclude that the information provided by these variable were significant for forecasting purposes.

Smith (2001) investigated data for the period of 1991 to 2001 to understand how gold prices were related to U.S stock prices and found that there was a negative relation between these two variables. Furthermore, Smith (2002) investigates the short and long run relation between the stock market and gold prices. By using three differing gold price quotations from the London exchange (at 10:30, at 15:00 and closing time) and 18 different stock market indices, he found that gold and stock prices exhibited a negative relation in the short run whereas in the longrun they showed no significant relationship. Kaliyamoorthy and Parithi (2012) also tested the relation between gold prices and stock market for data from 2009 to 2010 through the Chi Square test and found that there was no significant relationship between stock prices and gold rates. They conclude that there was no significant causal relationship between the increase in the gold price and the increase in the stock market index.

Since, most studies on stock markets have been done on developed countries, this research attempts to find the impact of exchange rate, international oil and gold prices on the BISTBANKS index growth in Turkey. As an emerging market country, Turkey suffers from instable economic environment. Depreciation of Turkish Lira, highly volatile real interest rates and high inflation rates are key contributing factors to the

economic instability of Turkey. Thus, it is valuable to investigate the influence of some of the macroeconomic variables on banks stock return in Turkey.

Chapter 3

DATA AND METHODOLOGY

This study investigates how the changes in oil prices, exchange rates and gold prices affect the BIST BANKS Index growth in Turkey. The description of the data and methodology employed in this research are discussed in the following sections.

3.1 Data

This research used weekly data between the years 2016 and 2018. The sample period data amounted to a total number of 584 observations and was obtained from the Data Stream Data base. Table X below provides a summary of the variables used in this research and their abbreviations.

Table 3.1. Summary of Variable Description

Variable	Abbreviation	Proxy (formula)
BISTBANKS growth (%)	ΔXBANK	$(XBANK_t - XBANK_{t-1})/XBANK_{t-1}$
Oil price changes (%)	ΔOIL	$(OIL_t - OIL_{t-1})/OIL_{t-1}$
Exchange rate changes (%)	ΔUSD	$(USD_t - USD_{t-1})/USD_{t-1}$
Gold price changes (%)	ΔGOLD	$(GOLD_t - GOLD_{t-1})/GOLD_{t-1}$

Note: BISTBANKS is an index of 12 Turkish banks which are traded in Borsa Istanbul. These include: Akbank, Albaraka Turk, Denizbank, Garanti Bank, ICBC Turkey, QNB Finansbank, Sekerbank, TSKB, Turkiye Halk Bank, Turkiye Is Banksasi, Vakif Bankasi, Yapi ve Kredi Banksi.

The variable ΔXBANK is derived from calculating the weekly holding period rate of growth of the BISTBANKS (see table 3.1 above). Information obtained from the

International Energy Agency (IEA) asserts that as of the 2016 year end, 16% of Turkey's total imports consisted of mineral oils and fuels; one of the largest in a decade of the Turkish fuel import history. This implies that Turkey as an oil importing country has much reliance on oil and natural gas consumption for growth. In this regard, we induce that positive changes in oil prices will have a negative effect on the performance of bank stock dividends and their returns. We therefore formulate the following hypothesis;

H1: There is a negative relationship between ΔXBANK and ΔOIL.

Exchange rate movements are represented by the variable ΔUSD. As shown in Table 3.1 above it is the weekly change of the dollar spot rates expressed in Turkish Lira. An increase in this ratio reflects depreciation in the Turkish lira and vice versa. Choi et al. (1992) assert that the extent of exchange rate risk exposure banks experience is highly dependent on their Net foreign exchange positions (NFP) and employment of hedge instruments. According to Karahnoglu and Ercan (2015), Turkey has assumed a negative saving gap with an average open NFP (foreign denominated liabilities > foreign denominated assets), this implies an increase in interest costs in the event of a depreciation in the home currency. Also, given that the Turkish financial market has been characterized with fair resilience to much sophisticated financial products, few are left to be desired with regards to hedging opportunities. The second hypothesis is thus formulated.

H2: There is a negative relationship between ΔXBANK and ΔUSD.

In this study, gold returns (ΔGOLD) reflect the weekly holding period rate of returns on holding gold. It has been commonly observed that changes in gold prices portray countercyclical movements in regard to general economic activities (Moore, 1990). In Turkey, Buyuksalvarci (2010) observed that Turkish investors alternate to invest in gold when equity prices are high and vice versa. Given that the BISTBANKS index ΔXBANK is assumed to capture the general economic performance and conditions peculiar to the banking sector, we expect to see a negative relation with gold returns as well. Thus, the hypothesis is:

H3: There exist a negative relationship between ΔXBANK and ΔGOLD

3.2 Methodology

This research uses OLS methodology to investigate the effects of the macro economic factors, oil returns, exchange rate movements and gold returns on the BISTBANKS index growth in Turkey. As previously mentioned, first the properties of the data series are investigated via unit root testing; this followed by the regression analysis and lastly a residual diagnosis is performed for robust check. All analyses were performed using the statistical software program E-views 9.

3.2.1 Unit Root Tests

It is mandatory to check the stationarity of variables when dealing with time series data. This is especially important as to make general inferences about the properties of a time series data, it should follow a mean reversing process i.e. it should have a constant mean and variance over time otherwise it is said to have unit root (Brooks, 2014). When the time series data are non-stationary, the application of conventional econometric estimation techniques such as OLS provides spurious estimates. The current study applied the Augmented-Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests to check for unit root and the Kwiatkowski, Phillips, Schmidt and Shinn

(KPSS) test of stationarity as a confirmatory analysis (Dickey & Fuller, 1981; Phillips & Perron, 1988; Kwiatkowski et al., 1992).

Augmented Dickey-Fuller Unit Root Test: The ADF test, an advancement of the Dickey Fuller test, was introduced to correct for serial correlation in error terms there by avoiding spurious results. The ADF function test the null hypothesis of unit root using three different model specifications:

Model 1: Random walk only

$$\Delta Y_t = \phi Y_{t-1} + \sum_{j=1}^{p} \Omega_j \, \Delta Y_{t-j} + \mu_t, \quad (1)$$

Model 2: Random walk with constant

$$\Delta Y_t = \alpha_1 + \phi Y_{t-1} + \sum_{j=1}^{p} \Omega_j \, \Delta Y_{t-j} + \mu_t, \quad (2)$$

Model 3: Random walk with constant and a deterministic trend

$$\Delta Y_t = \alpha_1 + \phi Y_{t-1} + \alpha_2 t + s \sum_{j=1}^{p} \Omega_j \, \Delta Y_{t-j} + \mu_t, \quad (3)$$

Where, $Y(\phi = \Pi - 1)$ denotes the variable of interest; $\alpha_1$the constant term; $\alpha_2 t$ the drift component; p the lagged differenced terms and $\mu_t$the white noise term ~ (0, Ʊ). The ARMA structure of the residuals is approximated by ΔY_{t-j} such that μ_t serially uncorrelated and homoscedastic. The null and alternative hypotheses are given as:

H_0: $\phi = 0$ (Y_t has a unit root)

H_1: $\phi < 0$ (Y_t is stationary)

Phillips-Perron Unit Root Test: The PP and ADF unit root tests mainly differ in how they account for serial correlation and heteroscedasticity in the error terms. The regression for the PP test is given as;

$$\Delta y_t = \beta' D_t + \pi y_{t-1} + \mu_t \quad (4)$$

Where the error term μ may be heteroskedastic. Unlike the ADF, PP doesn't correct for serial correlation in the regression model, instead it introduces a new statistic (t) in the error term. This new statistic is estimated using Newey-West method which provides consistent estimates of the variance parameters. Similar to the ADF the PP test for the null hypothesis of unit root (π=1) against the alternative of stationarity.

KPSS Unit Root Test: Unlike the PP and ADF unit root tests, the KPPS differs in that it assumes a null hypothesis of stationarity in Y_t. Also, the KPSS checks for stationarity by using the Lagrange multiplier (LM) test statistic in checking whether σ^2_ε=0 (Y_t is stationary) as null hypothesis against the alternate of σ^2_ε> 0 (Y_t is non stationary). The Lagrange Multiplier is given as;

$(T^{-2}\sum^{T}_{t=1}\hat{S}^2_t)/\lambda$, where by $\hat{S}_t=\sum^{t}_{j=1}\hat{u}_j$, (5)

Under the null of stationarity, the Kwiatkowski, Phillips, Schmidt and Shin show that the form of the deterministic terms is what determines the process of convergence into a function of standard Brownian motion and not the value of their coefficients.

Given that all variables are found to be stationary, the usage of conventional econometric estimation is possible. In this regard, the next step consists of performing OLS estimation technique in analysing the relationship among the dependent and independent variables.

3.2.2 Model Specification and Regression Analysis

A number of studies have investigated the relationship between bank performance and various macro-economic factors. This study analyzes the effect of exchange rate changes, oil and gold price movements on BISTBANKS growth in Turkey. In this regard, the following functional relationship is established;

$$\Delta XBANK = f \{\Delta OIL, \Delta USD, \Delta GOLD\} \quad (6)$$

Where bank index return (ΔXBANK) is a function of oil price changes exchange rate changes and gold price changes

Regression Analysis: This study employs the OLS estimation technique in investigating the functional relationship among the variables of interest. Given that the relationship is investigated with more than one dependent variable, we use a multiple regression (Hair et al., 2006). The Multiple Linear regression function is expressed as:

$$Yi = \alpha + \beta_1 X_1 i + \beta_2 X2i + \dots \beta_n Xni + ui \quad (7)$$

Where Y is the dependent variable, X the independent variable, α intercept, $\beta_{1\dots}\beta_n$ the partial regression coefficients of the independent variables, u the residual term and i the i^{th} observation. Under the CLRM, the OLS estimates of $\beta_{1\dots}\beta_n$ denoted as $\widehat{\beta 1}_{\dots}\widehat{\beta n}$ are considered to be BLUE (Best Linear Unbiased Estimates) with homoscedastic and uncorrelated terms (u~ N (0, $\boldsymbol{\sigma}$).

Taking into account the intercept, the error term and expected signs of the independent variables, the regression equation for our model is specified as:

$$\Delta XBANK_t = \beta_0 + \beta_1 \Delta OIL_t + \beta_2 \Delta USD_t - \beta_3 \Delta GOLD_t + \varepsilon_t \quad (8)$$

Where by β_1, β_2 and β_3 represent partial regression coefficients for OIL, USD and GOLD respectively and β_0 represent the intercept and ε_t the error term.

Residuals diagnostics: The authenticity or our regression estimates rely heavily on the CLRM assumption that error terms follow a white noise process i.e. u~ N (0, Ʊ). The validity of this assumption on our regression output is verified by applying normality, autocorrelation and heteroscedasticity tests. Autocorrelation and normality were tested using the Breusch-Godfrey Serial Correlation LM Test and Jarque-Bera

test respectively. Meanwhile, heteroscedasticity was verified by using the Glesjer and Harvey-Godfrey tests.

Chapter 4

EMPERICAL RESULTS

In this section, the findings of the empirical analysis are discussed. The properties of the series are tested for unit root prior to been regressed as illustrated by the model in Chapter 3. When the order of integration has been determined as I(0), a multiple regression analysis is performed followed by a diagnosis of the residual terms.

4.1 Unit Root Tests

The stochastic progression of the time series variables is investigated via unit root testing. The ADF (Dickey & Fuller, 1981), PP (Phillips & Perron, 1988) and KPSS (Kwiatkowski et al., 1992) tests were applied for this procedure and summarized in Table 1 below.

The findings from the unit root tests reveal that all the series are stationary at level form. Both the ADF and PP tests with similar null hypothesis provide sufficient statistical evidence in rejecting the presence of unit root in the progression of the series. KPSS, tested the reverse null hypothesis of stationarity and confirmed the ADF and PP tests in concluding that the series are I(0). In this regard, proceeding with the usage of conventional econometric methods of estimation such as the OLS, t and F tests would be suitable (Park & Fuller, 1995).

Table 4.1. Unit Root Tests Results

Statistics (Level)	ΔXBANK	lag	ΔGOLD	lag	ΔOIL	lag	ΔUSD	Lag
τ_T (ADF)	-12.67***	(0)	-10.31***	(0)	-12.19***	(0)	-12.54***	(0)
τ_μ (ADF)	-12.59***	(0)	-10.34***	(0)	-12.11***	(0)	-12.59***	(0)
τ (ADF)	-12.58***	(0)	-10.38***	(0)	-12.15***	(0)	-12.34***	(0)
τ_T (PP)	-12.67***	(1)	-10.25***	(5)	-12.21***	(5)	-12.51***	(4)
τ_μ (PP)	-12.59***	(1)	-10.28***	(5)	-12.12***	(4)	-12.56***	(4)
τ (PP)	-12.59***	(1)	-10.30***	(5)	-12.15***	(4)	-12.36***	(5)
τ_T (KPSS)	0.05	(2)	0.05	(3)	0.06	(6)	0.05	(4)
τ_μ (KPSS)	0.18	(0)	0.05	(2)	0.17	(4)	0.06	(4)

Note: ***, ** and * denote rejection of the null hypothesis at the 1 percent, 5 percent and 10 percent levels respectively. Tests for unit roots have been carried out in E-VIEWS

All of the series are at their natural logarithms. τ_T represents the most general model with a drift and trend; τ_μ is the model with a drift and without trend; τ is the most restricted model without a drift and trend. Numbers in brackets are lag lengths used in ADF test to remove serial correlation in the residuals. When using PP test, numbers in brackets represent Newey-West Bandwith (as determined by Bartlett-Kernel). Both in ADF and PP tests, unit root tests were performed from the most general to the least specific model by eliminating trend and intercept across the models.

4.2 Correlation Analysis

The OLS estimation requires that there be a less than perfect linear relationship among the estimators for validation. For preliminary checks, the correlation matrix was employed to investigate the linear association between the variables. The coefficients of the variables under investigation are shown in Table 2 below.

Table 4.2. Correlation Matrix

	ΔXBANK	ΔGOLD	ΔOIL	ΔUSD
ΔXBANK	1.000000	-	-	-
ΔGOLD	0.082557	1.000000	-	-
ΔOIL	0.242030	0.040576	1.000000	-
ΔUSD	-0.573198	-0.186157	-0.140039	1.000000

The results above assert that the relation among the predictors are "moderate" ($\rho \leq 0.5$) for all variables except for the variable ΔUSD. The small coefficients indicate the low probability of been affected by common factors in other words signaling the absence of multi-collinearity among the predictors.

4.3 OLS Estimation Results

Subsequent to checking the properties of the variables, the regression was run and analyzed. Found in table 3 below is a summary of the regression analysis. As earlier mentioned, the sample formed a total amount of 584 observations with a weekly frequency.

Table 4.3. Regression Results

Independent Variables	Coefficient	Std. Error	t-statistic	P-value
C	0.47	0.22	2.09	0.04
ΔOIL	0.10	0.04	2.41	0.01***
ΔUSD	-1.05	0.13	-7.97	0.00***
ΔGOLD	-0.05	0.13	-0.39	0.69

R-squared = 0.355976; Adj. R-squared = 0.342176; F-statistic = 25.79442; Prob (F-statistic) = 0.0000; Durbin-Watson Stat = 2.015282.

Note: *coefficient is significant at α = 10%, **coefficient is significant at α=5%, *** coefficient is significant at α=1%.

In reference to Table 3 above out of three, two variables, ΔOIL and ΔUSD are significant at 5% whereas ΔGOLD is not. With regard to the sign of the coefficients, the variable ΔUSD met with our priori expectations meanwhile the variable ΔOIL did not.

Price shocks in the market for oil have a positive relation with the BISTBANKS index growth. The interpretation is such that when all other factors are held constant, a 1% increase in oil price increases the BISTBANKS by 0.1%. These results deviate from our prior expectations; nevertheless, they are supported by few other researchers for similar oil importing countries (Zhu et. al, 2014; Le & Chang, 2015; Kilian, 2009). Kilian (2009) explains this positive relation in oil importing countries as a resulting factor of a demand induced shock of oil prices due to booming global economic activities. This is fairly understandable when we consider the actions taken my many countries aiming to recover from the 2007-09 Global financial crisis of which Turkey made no exception. By reducing its central bank policy rate with 10 percentage points to almost a zero real interest rate and increasing its government spending from 13% to

16% of GDP, Turkey managed to boost its economic activities from the year 2011 onwards though it was perceived as unsustainable in part due to deteriorating EU relations at the time (Acemoglu & Ucer, 2015). The previously mentioned expansionary policies could justify the boost in economics activities that would later induce the reverse phenomenon of demand led to increase in oil prices.

According to the International Energy Agency (IEA), Turkey was one of the top 25 importers of crude oil across the globe in 2016, and in 2017, mineral fuels including oil led the list of total imports with a percentage of 15.9%. Given that Turkey is a major oil importing country, this implies that positive changes in the oil prices may be an indication of a prospering economic environment for businesses; this augments the demand for oil. This occurrence is usually a symptom of the economy recovering following a recession. In such case, global demand induces increases in prices. Firms satisfy this increase in demand by acquiring more production inputs such as fuel and capital. As such, banks are found to experience higher turnover in loans which are also associated with higher interest and non-interest revenues.

As expected the depreciation of the Turkish lira as per the US dollar share a negative relationship with the BISTBANKS growth (Kasman, Vardar, & Tunç, 2011). According to the estimation's output, when the Turkish lira to dollar rate depreciates by 1%, the growth of the BISTBANKS index reduces by a rate of 1.05%. Given that the dollar is a major legal tender for transactions and settlement of debts across international markets, it proxies the sensitivity of the BISTBANKS growth to exchange rate risks. Karahnoglu and Ercan (2015) observed that the growing negative saving gap experienced by the Turkish economy has increased the net foreign position of most Turkish banks. Hence, in the event of the dollar appreciation, banks are set to

incur losses which are then reflected on their stock returns. This is particularly true as Turkey's emerging stock market offers only a few and less sophisticated hedging opportunities to assist efficient diversification to mitigate exchange and interest rate risks. Also, the depreciation of Turkish Lira will cause the growth of BISTBANKS index to fall as foreign investors will be compelled to switch from Turkish securities (specifically bank share holdings) to dollar denominated securities to avoid further losses from exchange rate movements.

4.4 Robustness of the Regression Output

The robustness of the regression output was investigated via a residual analysis. To this aim, tests of normality, autocorrelation and heteroscedasticity were applied on the model's residuals. As it can be seen in appendix 1, the values of the skewness (0.51) and that of the kurtosis (3.47) appear to slightly deviate from their boundaries of 0 and ± 2 respectively. However, the Jarque-Bera test summarized the normality of the error terms by failing to reject the null hypothesis of normality at a 5% (prob. (0.02)) level of significance.

Furthermore, the residuals were tested for autocorrelation using the Breusch-Godfrey Serial Correlation LM Test. At a 5% (prob. 0.7499) level of significance, the test failed to reject the null hypothesis of no autocorrelation thus concluding in favor of no autocorrelation among residual terms.

Similarly, the Glesjer and Harvey-Godfrey test were used to test for heteroscedasticity in the error terms. At a 5% (prob. 0.25; 0.80) level of significance, they both fail to reject the null hypothesis of no heteroscedasticity and therefor conclude in favor of no heteroscedasticity in error the terms. It is important for the researcher to highlight that

the model's joint significance measured by the F statistic and the R-squared is sidelined due to the nature of the research questions, which is other than identifying the determinants of BISTBANKS growth.

The previously mentioned tests certify that the coefficients of our model are correctly estimated by the OLS regression method. This implies that for the period of 2016-2018, the Turkish banking sector responded positively to shocks in oil prices and negatively to the appreciation of the dollar. The unexpected response of BISTBANKS index to oil prices shocks is an indication of a demand induced oil price movements as the global economic activities continuously flourish or engage into oil requiring transactions

Chapter 5

CONCLUSION

5.1 Conclusion

In theory, dramatic changes in oil price would affect the stock returns by determining the expected cash flows in future as well as influencing the discount rate for converting the aforementioned expected cash to present value. Oil as a vital input for almost all the operative process is a strong determinant of operation cost. Hence, an increase in oil price would add to cost of production and reduce the expected profits in industries, which are not involved in oil products. Consequently, the collective fall in expected cash flow relating to aforementioned industries would affect their respective stock prices as well as the stock index as the indicator of the whole stock market. In parallel, a rise in oil price would create an environment to predict an increase in total trade deficit followed by devaluation of domestic currency and growing inflation rate. As a result, an increase in inflation rate would cause a decrease in stock prices as well as a rise in discount rate (Huang et al., 1996).

According to Kayalar et al (2016) findings, changes in oil prices would affect financial indicators differently based on the nature of countries' markets. Countries' markets are categorized as exporter/importer of oil and emerging/developed markets and a comprehensive research on the relationship of crude oil prices and exchange rate, as well as stock market indices based on aforementioned categorizations has been conducted. West Texas Intermediate (WTI) oil prices significantly affects different

currency rates and this relationship is more significant after global crisis and fall of crude oil price in 2014.

Kayalar et al (2016) concludes that emerging oil exporting countries such as Russia and Brazil has the most dependent economy towards crude oil prices, while, developed oil- exporting countries such as Canada and Norway, ranked second. In addition, the emerging oil importing countries (e.g. Turkey, China and India) are in third place, whereas, developed oil- importing countries such as Australia and Japan have the least dependent economies towards crude oil prices.

Kayalar et al (2016) provides a more detailed research on Turkish case regarding the relation between Crude oil prices and Turkish Lira to U.S dollar exchange rate, as well as the most relevant stock indices of Borsa Instanbul. It is observed that stock indices are positively dependent on crude oil prices, while there is a negative dependency of exchange rates towards WTI prices. Evidently, after 2014 (post-crisis era), the level of dependency of aforementioned factors towards WTI prices has been increased.

Najaf (2016) states that there is a negative relationship between international crude oil prices (e.g. WTI oil price) and stock market of Malaysia and Turkey while Malaysia stock exchange is more sensitive to international oil price changes.

Recent studies' findings are aligned with classic articles such as Sadorsky (1999). Sadorsky (1999) confirms that returns on US real stock are sensitive to changes in crude oil prices. The prices of fossil energy resources such as oil and natural gas are in negative relationship with prices of US stocks.

Kilian & Park (2009) analyses the sources of causes regarding changes in oil prices and they found supply and demand are the main sources. Economic developments as positive shocks at global level causing stimulation in economic growth and oil demand. Demand increases caused by positive shocks yield higher oil prices accompanied by higher returns, however, the growth in prices are concluded as short-term effects. On the contrary, there are some economic shocks caused by predicted supply deficits in future, which cause a dramatic increase in present demand along with a decline in stock returns. In addition, there was no significant association between dramatic changes in supply and stock returns. There has been an upward trend in daily demand for crude oil since 2006 ("Daily Global Crude Oil," 2018) and OPEC announced their growing concern towards future daily demand for crude oil ("Why OPEC Is Concerned," 2018).

Ozturk & Arisoy (2016) describes Turkey as a country with growing dependency on importing of oil. They support their conclusion via statistical data showing annual increase in domestic oil consumption. Turkey supplies 90 percent of its crude oil consumption through importing, however, the share of oil in total energy resources employed in Turkey is decreasing. With examining two main determiners of crude oil demands in theory, which are price and income, Ozturk & Arisoy (2016) found that the empirical and significant determiner for crude oil demands is income in Turkey. The resulted income elasticity value (1.182) explains that imported crude oil in Turkey behaves like a normal good and with an increase in income level, the consumption of crude oil would grow.

Wand & Sun (2017) suggests that demand for oil is not sensitive to the changes in price of oil, however, those economic activities capable of specifying the level of

countries' dependency on oil can affect oil price. In addition, regional and political conflicts of oil-exporting countries can yield to dramatic changes in oil price when aforementioned conflicts are able to hinder oil supplies.

Ho & Iyke (2017) confirms that stock market can be developed through growth in real income and however inflation rate has a negative relationship with growth in stock market. Furthermore, the changes in exchange rate has the negative relationship with stock market growth, while interest rate can assist or hinder stock market development depends on other conducted monetary policies.

Based on what is mentioned, we can conclude increasing daily demand for crude oil at global level accompanied by recent regional and political conflicts in MENA (Middle-East and North Africa) as the Silk Way of global oil industry have provoked concerns about future oil supply. In addition, the nature of Turkey economy as not-yet-developed/emerging oil-importing country, explains their dependency to international crude oil. These phenomena are found to be the reasons underlying significant association of crude oil demand and Turkish stock market.

5.2 Statistical conclusion

According to the regression result, changes in exchange rate and oil prices are significant at 5% while gold price changes has no significant effect on BISTBANKS growth. Regarding the signs of coefficients, exchange rate changes met our priory expectation however oil did not.

The result of OLS test suggests that a significant negative relationship exists between changes in USD/TRY exchange rate and BISTBANKS growth. Interpreting the regression output, when USD/TRY increases by 1%, holding all the other factors

constant, BISTBANKS return decreases by 1.05%. According to Karahnoglu and Ercan (2015) this is because the net foreign position of majority of Turkish banks has increased due to the growing negative saving gap by Turkish economy. In this case, when USD appreciates against TRY, banks are subject to incur losses which can lead to lower stock prices. Furthermore, since there are less hedging tools to decrease the exchange and interest rate risks in Turkish emerging stock market. In addition, depreciation of TRY causes foreign investors to shift their capital from Turkish securities to foreign denominated securities. This will also cause a decline in Turkish stock prices.

On the other hand, the impact of the changes in oil prices on the BISTBANKS growth seems to be positive and significant. Interpreting the result, if oil prices increase by 1% when all the other variables are constant, BISTBANKS growth will increase by 0.1%. Although this outcome doesn't meet our expectation, the coefficient is very small and also there are several other studies supporting a positive relationship between oil prices and stock market returns. Positive relation between oil price increases derived from demand during booming global economy activities with stock prices is explained by Kilian (2009). When the economy recovers after a recession, the increase in the demand for oil globally leads to an increase in oil prices. Since Turkey is an oil importing country, this positive relation might be due to the growing economy and the growth incentive policies of the government which leads to demand for oil. Firms' demand for oil for further production and expansions resulting banking sector to experience higher income generated from loans and fees which results in higher stock prices.

5.3 Recommendation

The outcome of this thesis can be helpful for investors and long-term traders who aim to generate capital gain by investing in banks' shares in Turkey. Considering the negative significant relation between USD/TRY and BISTBANKS return, investors may perform different actions depending on the currency exchange rate changes. In the case where USD/TRY increases, investors who already hold shares of Turkish banks should sell their shares and those who do not hold should not jump in the market. On the other hand, if USD/TRY decreases, Investors should start buying stocks of Turkish banks.

Regarding oil price changes, in the case of a boom economy, investors may buy stocks of Turkish banks when the global oil price tends to increase and sell their stocks when oil price tends to decline.

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APPENDICES

Appendix A: Output of Regression Analysis

Dependent Variable: XBANK
Method: Least Squares
Date: 05/14/18 Time: 22:06
Sample (adjusted): 6/03/2015 2/28/2018
Included observations: 144 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.469717	0.224826	2.089243	0.0385
OIL	0.103762	0.042977	2.414392	0.0171
USD	-1.047185	0.131415	-7.968517	0.0000
GOLD	-0.049992	0.125501	-0.398340	0.6910

R-squared	0.355976	Mean dependent var	0.204121
Adjusted R-squared	0.342176	S.D. dependent var	3.272492
S.E. of regression	2.654199	Akaike info criterion	4.817548
Sum squared resid	986.2682	Schwarz criterion	4.900042
Log likelihood	-342.8634	Hannan-Quinn criter.	4.851069
F-statistic	25.79442	Durbin-Watson stat	2.015282
Prob(F-statistic)	0.000000		

Appendix B: Output of the Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.578573	Prob. F(7,133)	0.7724
Obs*R-squared	4.255390	Prob. Chi-Square(7)	0.7499

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/14/18 Time: 22:39
Sample: 6/03/2015 2/28/2018
Included observations: 144
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000903	0.227416	0.003972	0.9968
OIL	0.005301	0.043803	0.121017	0.9039
USD	-0.026588	0.137127	-0.193892	0.8466
GOLD	-0.011287	0.129339	-0.087266	0.9306
RESID(-1)	-0.009597	0.086867	-0.110475	0.9122
RESID(-2)	-0.110260	0.087125	-1.265538	0.2079
RESID(-3)	-0.038020	0.088425	-0.429972	0.6679
RESID(-4)	0.087177	0.087950	0.991212	0.3234
RESID(-5)	-0.060892	0.089101	-0.683400	0.4955
RESID(-6)	-0.044504	0.089938	-0.494829	0.6215
RESID(-7)	-0.040295	0.090603	-0.444740	0.6572

R-squared	0.029551	Mean dependent var	-1.39E-17
Adjusted R-squared	-0.043415	S.D. dependent var	2.626210
S.E. of regression	2.682613	Akaike info criterion	4.884773
Sum squared resid	957.1227	Schwarz criterion	5.111634
Log likelihood	-340.7037	Hannan-Quinn criter.	4.976956
F-statistic	0.405001	Durbin-Watson stat	1.992801
Prob(F-statistic)	0.942325		

H_0: Residuals are not serially correlated
H_1: Residuals are serially correlated

We fail to reject null hypothesis at a 5% level of significance and therefore conclude that the residuals are not serially correlated.

Appendix C: Output of the Glejser Test for Heteroscedasticity

Heteroskedasticity Test: Glejser

F-statistic	1.371728	Prob. F(3,140)	0.2540
Obs*R-squared	4.111896	Prob. Chi-Square(3)	0.2496
Scaled explained SS	4.140402	Prob. Chi-Square(3)	0.2467

Test Equation:
Dependent Variable: ARESID
Method: Least Squares
Date: 05/15/18 Time: 21:02
Sample: 6/03/2015 2/28/2018
Included observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.017495	0.135942	14.84082	0.0000
OIL	0.016277	0.025986	0.626387	0.5321
GOLD	0.053539	0.075885	0.705533	0.4817
USD	0.155830	0.079461	1.961088	0.0519

R-squared	0.028555	Mean dependent var	2.066738
Adjusted R-squared	0.007738	S.D. dependent var	1.611119
S.E. of regression	1.604873	Akaike info criterion	3.811351
Sum squared resid	360.5865	Schwarz criterion	3.893846
Log likelihood	-270.4173	Hannan-Quinn criter.	3.844873
F-statistic	1.371728	Durbin-Watson stat	1.640981
Prob(F-statistic)	0.253975		

H_0: The residuals are not heteroskedastic
$H_{1:}$ The residuals are heteroskedastic

We fail to reject null hypothesis at a 5% level of significance and therefore conclude that the residuals are not heteroskedastic

Appendix D: Output of the Harvey Test for Heteroscedasticity

Heteroskedasticity Test: Harvey

F-statistic	0.325501	Prob. F(3,140)	0.8069
Obs*R-squared	0.997446	Prob. Chi-Square(3)	0.8019
Scaled explained SS	0.863650	Prob. Chi-Square(3)	0.8342

Test Equation:
Dependent Variable: LRESID2
Method: Least Squares
Date: 05/15/18 Time: 21:21
Sample: 6/03/2015 2/28/2018
Included observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.639704	0.176962	3.614917	0.0004
OIL	-0.006275	0.033827	-0.185517	0.8531
GOLD	0.061523	0.098783	0.622815	0.5344
USD	0.084433	0.103438	0.816270	0.4157

R-squared	0.006927	Mean dependent var	0.666561
Adjusted R-squared	-0.014353	S.D. dependent var	2.074304
S.E. of regression	2.089138	Akaike info criterion	4.338764
Sum squared resid	611.0295	Schwarz criterion	4.421259
Log likelihood	-308.3910	Hannan-Quinn criter.	4.372286
F-statistic	0.325501	Durbin-Watson stat	1.825154
Prob(F-statistic)	0.806920		

H_0: The residuals are not heteroskedastic
$H_{1:}$ The residuals are heteroskedastic

We fail to reject null hypothesis at a 5% level of significance and therefore conclude that the residuals are not heteroskedastic