T.C.

ISTANBUL SABAHATTIN ZAIM UNIVERSITY

GRADUATE EDUCATION INSTITUTE

DEPARTMENT OF ISLAMIC ECONOMICS AND FINANCE

DIVERSIFICATION BENEFITS OF TURKEY-BASED INVESTORS: EVIDENCE FROM TOP TRADING PARTNERS BASED ON MULTIVARIATE-GARCH APPROACH

MASTER THESIS

Nagihan KILIÇ

Istanbul

September-2021

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THESIS APPROVAL

This study has been approved in partial fulfillment of the requirements for MA Degree in Islamic Economics and Finance.

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Director, Institute of Social Science

DECLARATION OF SCIENTIFIC ETHICS AND ORIGINALITY

This is to certify that this MA thesis titled “Diversification Benefits of Turkey-Based Investors: Evidence from Top Trading Partners Based on Multivariate-GARCH Approach” is my own work and I have acted according to scientific ethics and academic rules while producing it. I have collected and used all information and data according to scientific ethics and guidelines on thesis writing of Sabahattin Zaim University. I have fully referenced, in both the text and bibliography, all direct and indirect quotations and all sources I have used in this work.

Signature

Nagihan KILIÇ

Istanbul, September 2021

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Firstly, I would like to begin by thanking Allahu Ta'ala for the opportunity to accomplish my master's research.

It is a great honor for me to dedicate this work to my dear family: my husband İrfan, my daughter Elif Ayşe and my son Ahmet Asaf, who provided their continuous support, patience, and unwavering belief.

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Nagihan KILIÇ
İstanbul, September 2021

ÖZET

ÇOKLU GARCH YAKLAŞIMINA GÖRE TÜRK YATIRIMCILARIN EN FAZLA TİCARET YAPILAN PARTNER ÜLKELERDE ÇEŞİTLENDİRME GETİRİLERİ

Nagihan KILIÇ

Yüksek Lisans, İslam Ekonomisi ve Finansı

Tez Danışmanı: Doç. Dr. Burhan ULUYOL

Eylül-2021, 77+x Sayfa

Bu çalışmanın amacı Türkiye'de yerleşik hisse senedi yatırımcılarının Türkiye ile en yüksek ticaret hacmine sahip ülkelerde çeşitlendirme getirilerini ölçmektir. Portföy çeşitlendirme getirileri 2 çeşit hisse senedi yatırımcısı açısından analiz edilmiştir: geleneksel hisse senedi yatırımcıları ve İslami hisse senedi yatırımcıları. Türk hisse senedi günlük getirilerinin seçilmiş hisse senedi getirileri ile arasındaki zamana göre değişen korelasyonları tahmin etmek için 22 Ocak 2008'den 22 Ocak 2021'e kadar olan 13 yıllık döneme ait hisse senedi günlük getirileri baz alınarak DCC çoklu GARCH yöntemi kullanılmıştır. Sonuçlar Türkiye'de yerleşik geleneksel ve İslami hisse senedi yatırımcıları için ticaret ortakları arasında en yüksek çeşitlendirme getirisi ABD hisse senetlerinin sunduğunu göstermiştir. Genel olarak, İslami hisse senetleri geleneksel hisse senetlerine göre ticari partner ülkeler ile daha düşük korelasyon göstermiştir. Türkiye ve Rusya volatilitesi en yüksek endeksler olarak kaydedilmiştir.

Anahtar Kelimeler: MGARCH DCC, Katılım Endeksi, Islami Endeks, Ticari Partner, Türkiye

ABSTRACT

DIVERSIFICATION BENEFITS OF TURKEY-BASED INVESTORS: EVIDENCE FROM TOP TRADING PARTNERS BASED ON MULTIVARIATE-GARCH APPROACH

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Master, Islamic Finance and Economics

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The aim of this study is to measure portfolio diversification benefits of the Turkey-based equity investors into top trading partner countries. Portfolio diversification benefits are analyzed from the viewpoint of two types of investors in Turkey: conventional equities investors and Islamic equity investors. In order to evaluate the time-varying correlations of the trading partner country's stock index returns with the Turkish stock index returns, the multivariate GARCH-DCC is applied based on daily data covering 13 years period between 22 Jan 2008 to 22 Jan 2021. The results revealed that the US stock indices provide the most diversification benefit for both conventional and Islamic Turkey-based equity investors. In general, Islamic indices exhibit relatively lower correlation with trading partners than conventional indices. Turkey and Russia are recorded as the most volatile indices.

Key Words: MGARCH DCC, Participation Index, Islamic Index, Trading Partner, Turkey

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CHAPTER I

INTRODUCTION

The maximized or at least stable return with nominal risk is the main goal of all individual and institutional investors. Portfolio selection and investment diversification are the basic strategies to alleviate market risk (Markowitz, 1959). Diversification can be possible by composing different types of assets in portfolio such as commodities, derivatives, real estate, and private equity/hedge funds, etc. within the local market. However international diversification provides Special Avenue in terms of return and risk.

With considerably rapid growth of Islamic finance industry including Islamic capital markets as a result of wealth accumulation in oil producing Muslim countries, additionally growing interest from the West after 2008 global financial crisis, Islamic investment has become a significant segment for diversifying investments. Recent studies suggests that investors gets partial insulation or safer heaven by Islamic investments due to its filtering criteria. In other words, firms which are highly leveraged or whose main business is interest related or whose ratio of non-liquid assets to total assets is out of tolerable level are kept out of the index.

Due to recent events around the country like Brexit, Turkish coupe, depreciation of Turkish Lira day by day, Arab spring, the Syrian war, instability in the middle east, F35/S400 crisis with USA, capital flight; Turkey was affected by the consequences in terms of economy, tourism, the membership process to European Union. All these lead to financial instability and the market is hard to beat. Therefore, Turkish domestic investors need diversification activities. The subject of the thesis is to provide recent evidence to Turkey-based investors for international diversification potential among a set of 8 countries which are the top-trading ones with the country.

1.1 Problem Statement

As Turkey has a very volatile economy with high interest, high inflation and currency exchange rate fluctuations, it is crucial for Turkish investors to know diversification potential to achieve maximum return at the lowest possible risk level. Furthermore, international diversification may be vital for investors who restrict their investment to only a subset of investment universe through some specific screening criteria due to their belief or preferences like Islamic, green, socially responsible, ethical, etc. It is claimed that they are disadvantaged as they compose their portfolio among a limited number of sectors including technology, energy, consumption and service (Bauer, Otten, & Rad, 2006). In order to reduce risk and improve return, such investors can benefit from international diversification.

Although Turkey has the second highest GDP among Muslim-majority countries, it only accounts for around 3% of global total Islamic assets (Yas, Aslan, & Ozdemir, 2018) . In parallel, the growth of Islamic finance has been sluggish despite nearly 80 million Muslim population and nearly fifty years history of Islamic finance. Our intention in essence is to make Islamic investment more desirable for Turkey-based equity investors.

1.2 Research Objectives

The purpose of the thesis is to identify diversification benefit throughout top-trading 8 countries with Turkey using Multivariate GARCH DCC econometric model. Our study is not restricted only Islamic equity investment as our focus is Turkey-based investors, which is a secular country and Islamic finance industry is not well-developed yet. Therefore conventional investors can also get some practical implications for portfolio management. Additionally, one of our purposes is to give significant insights on possible cross-market spillover to the market authorities to take some corrective actions.

1.3 Research Questions

1. Should the Turkey-based conventional equity investors invest in top trading partners to gain international portfolio diversification benefits?
2. Should the Turkey-based Islamic equity investors invest in top trading partners to gain international portfolio diversification benefits?

1.4 Significance of the Study

The study makes an original contribution to the literature as there is a limited number of studies highlighting diversification opportunities at international level using Multivariate GARCH DCC method for Turkey-based Islamic investors.

1.5 Organization of the Paper

This study consists of six chapters. The rest of the paper after the introduction is organized in the following manner.

Chapter 2 provides an overview of Turkish economic and financial developments in a historical way. It also gives detailed information about Turkish capital markets including Islamic equity, sukuk and commodity markets.

Chapter 3 provides literature review from methodological and empirical perspectives. In Chapter 4, the technique and data utilized in this study are explained.

In Chapter 5, data analysis and empirical results are handled.

Finally, in Chapter 6, summary of the study, concluding remarks, limitations of the study and recommendations are reported.

CHAPTER II

THE TURKISH ECONOMY AND FINANCIAL MARKETS

2.1 The Turkish Economic and Financial Development

1960-1980 the command economy era

Within the foundation years -the 1920s, liberal market economic policies were put into practice as a brief open-economy experience. Nevertheless, the state shouldered the main role as the biggest entrepreneur in industrialization efforts due to insufficient private capital and economically powerful actors. The state direclty involved in production and investment. The country's economy was state-controlled, planned, and partially closed. Industries were protected through tariffs, foreign currency controls and capital movement restrictions. Import substitution on the real sector and negative interest rates were adopted as development strategy by the governments (Ari, 2012). Agricultural sector dominated the Turkish economy between 1923 and 1970 era. Trade had a limited role. Similar policies were pursueded till 1980.

1980-1989 liberalization phase

After a series of crisis hit the country in the late 1970's due to high inflation, detoriation of balance-of payments following the world oil price shock, the country put a radical structural adjustment program- the Economic Stabilization and Structural Adjustment Program on 24th of January 1980 into implementation with the assistance of IMF and the World Bank. It was a turning point for Turkish Economy in terms of policies employed. Turkey began to transform itself into a liberal economy. The program mainly consisted of trade liberalization process which included export promotion and gradual import liberalization; and financial liberalization process which primarily consisted of ending interest rate controls and capital movement liberalization (Ari, 2012) (Boratav & Yeldan, 2001).

The main goal is to restore economic growth by improving economic and financial efficiency, increasing domestic savings and attracting foreign capitals (Boratav & Yeldan, 2001). This new policy approach rendered a different role to the state in the development process. Measures were taken to give private sector a more predominant role in the economy. External trade policy was structurally transformed by lowering trade barriers and encouraging exports (Akat & Yazgan, 2013). After the liberalization of capital movements in 1989, Turkish economy was directly affected from both global and local changes by opening both goods and financial markets to foreign countries (AÇIKGÖZ, 2008).

Within the 1982–1989 period, the program bore fruit in financial indicators including inflation, export earning and economic growth (Rodrik, 1990). In fact, starting from 1980, Turkish economy was directly affected from both global and local changes by opening both goods and financial markets to foreign countries (AÇIKGÖZ, 2008). The initial success was accompanied by increasing indebtedness as well as budget and current account deficits (Aysan, Babacan, Gur, & Karahan, 2018) since The January 24, 1980 decisions could not be enough to transform the institutional structure of the economy. A deep financial crises occured in April 1994. Overnight rates increased to 700%, currency depreciated about 100% on the year basis, and GDP decreased by 5% (Ari, 2012).

1990's: The lost decade

The 1990s had been a lost decade for the country (Ari, 2012). Military interruptions, political and economic turbulance were the characteristics of the interval. In fact the military coups in the nation's history is quite noteworthy, which took place in 1960, 1971, 1980, and 1997. The military has been the guarantor of the country's integrity, stability, and modernity since the foundation of the Turkish Republic, and interfered to elected govenrment directly or even indirectly (Christofis, Kollias, Papadamou, & Stagiannis, 2010). Generally single-party governments was subverted by the military coups and successive weak coalitions were formed consequently. Adverse impacts of these interventions continued through the chain of the coalition goverments, beside the periods of military rule (Aysan, Babacan, Gur, & Karahan, 2018).

The way to the most severe 2000/2001 twin crisis

The Anti-Inflationary Program (AIP) was declared on December 9, 1999 under a stand-by agreement with the IMF, in the midst of a dire economic situation, collapsing output, increasing inflation, and spiraling public debt (Akat & Yazgan, 2013). The program targeted to reduce the high inflation rate with a fixed exchange rate policy, and to achieve both short- and long-term structural transformations such as the acceleration of privatization, new social security system regulations, institutional and administrative support for financial markets. Hence eventual aim was to overcome the economic problems of the 1990s and provide market confidence (Taşar, 2010). After the implementation of the program, inflation and real interest rates have initially decreased. However, with a fixed exchange rate regime, increase in budget deficit will increase financial vulnerability as reserves and liquidity are correlated (Eryilmaz & Tayyar, 2020). In the same year, the country hit by two massive earthquake disasters in 1999 in the most industrialized area of the country, which claimed 18,000 lives, leaving thousands of people homeless. The burden created by the earthquake disasters was estimated in the range of $4 to $8 billion for the Turkish goverment.

Not even two years had passed since the earthquake, the country suffered the costliest twin crises in its history. The first one was the November 2000 banking crisis. The overnight interest rate rose to 210%, reserves decreased by approximately 6 billion dollars and the stock market prices lost about 50%. The second one: the February 2001 currency crisis erupted, which was because of the short term capital movements. Inflation rate skyrocketed to 70%, domestic debt stock has risen fourfold, 19 banks declared bankruptcy, and economy contracted by 8% (Karaçor, 2006).

Turkey abandoned the exchange rate anchor and let the TL to float on February 22, 2001 by the decision of the IMF policymakers due to unsustainable liquidity, exchange rate and interest management (Akat & Yazgan, 2013) . With the transition to the floating exchange rate regime, the domestic currency lost about 250% of its value. In order to alleviate the negative consequences of the twin crises, the Transition to Strong Economy Program (TSEP) was introduced on May 15, 2001 with the support of the IMF and the World Bank as a diagnosis to crises originating from public and external deficits. Fiscal consolidation and export-led growth strategy were the two pillars of the program.To attain these goals, the new Central Bank law, introduction of a floating exchange rate regime along with inflation targeting, consolidation and strengthening of the banking system and fiscal balances, and foundation of a new banking regulatory and supervisory agency were among the reforms implemented by the government (Kara, Küçük-Tuğer, Özlale, Tuğer, & Yücel, 2007). Benefits targeted by fiscal consolidation were to reverse the adverse debt dynamics, relieve inflationary pressures, free resources for private investment, and reduce interest rates (Akat & Yazgan, 2013).

Despite massive natural and financial upheavals in the 1990s, a customs union agreement between the European Union (EU) and Turkey enacted on 31 December

1995. However, it is not possible to mention any development in process of Turkey's accession to Europen Union. Altough candidacy talks began officially in 1999, it suspended in 2007 due to South Cyprus's veto.

The 2000s: The Growth and Prosperity Period

The political and financial turmoil after the 2001 economic crisis paved the way to many structural reforms of Turkish economy. The substantial contribution of the Justice and Development Party (AKP), which establised in August 2001, can not be deniable in this preiod. AK Party rose to power as the single-party government, which was the beginning of Ak Party era from 2001 to the present day. In 2005, Turkey graduated to the status of upper-middle-income country and tripled its GDP per capita at the end of the decade within politically stable environment as a result of long lasting one-party govenrment.

Market-based and fiscal reforms have brought Turkey on economic boom with a growth rate of up to 7 percent over several years and promoted it to the status of a regional economic power. The national economy was ranked sixth in Europe and seventeenth in the world. The IMF declared Turkey a success story due to the remarkable economic growth in the global arena. Turkey is seen as a role model in its region by neighbor countries. Many reforms achieved in public services delivery such as education, health, infrastructure with priority in less-advantaged areas so that the gap between Turkey and the rest of the OECD was reduced. Wage growth and employment expansion resulted in labor income growth at the bottom of the distribution, which contracted income inequality. The middle class expanded and poverty rates reduced.Chronic inflation is one of the characteristics of Turkish economy, which had averaged around 20% in the 1970s, 60% in the 1980s, 80% in the 1990s, swiftly fell to 10% in the 2000s.

Turkey's solid progress in economy is stunning even in the aftermath of the 2008 global financial crisis, which arose from the US and affected many countries. Although Turkey was not immune to the 2008 GFC, the negative effects remained short-lived compared to the US and continental Europe (Akat & Yazgan, 2013) (Demir, 2019). The banking sector dominates the country's financial system (Aysan, Babacan, Gur, & Karahan, 2018). The banking sector was a significant contributor to the financial crises of 1994, 1998–1999, and 2000–2001, therefore priority was given to banking sector in structural refoms in the aftermath of 2000–2001 financial crisis (Aysan, Babacan, Gur,

& Karahan, 2018). Success of these comprehensive reforms were proven since the effects of the 2008 GFC on the Turkish economy remained limited. No Turkish financial institution suffered difficulties during the turbulence in the financial markets and there was no need for any support programs for the banking sector. It is undeniable that there was an abundance of liquidity in the world in the post-crisis period, from which Turkey also benefited for recovery (Demir, 2019). All macro economic indicators improved remarkably compared to their pre-crisis levels. The economy grew by 9.1 % in 2010 and 8.5 % in 2011, thus placing Turkey, for the first time in recent history, among the most rapidly growing economies (Akat & Yazgan, 2013). The gross domestic products has tripled from $707 billion in 2002 to $2.17 trillion in 2017. Turkey become an attractive destination for capital flows (Kara, Küçük-Tuğer, Özlale, Tuğer, & Yücel, 2007). During the recovery, capital inflows (primarily short-term) steadily increase, peaking at 9% in the spring of 2011 (Akat & Yazgan, 2013).
On the real side, Turkey's exports of goods and services grew at a compound annual rate of 22% between 2002 and 2008 (Akat & Yazgan, 2013). Between 2002-2008, Turkey exhibits outstanding import performance with 26 % average annual import growth, which is 10 and 4 kpoints above the world and upper-middleincome countries, respectively. However, outstanding import performance together with the appreciation of the TL also widened country’s current account deficit.

2013-2018 period

Although Turkey has implemented some of the most remarkable and long-awaited structural reform since 2001, growth trend in economy could not be permanent .Turkey has a susceptible economy to crisis, which can be defined as sudden and unexpected fluctiuations that will shake the country's economy from a macro perspective and companies from a micro perspective (Aktan & Şen, 2002) (Eryilmaz & Tayyar, 2020). Many factors including economic, non-economic, political, and non-political fosters economic crises in the country. In fact, Turkish economy enters into a recession period every five years (AÇIKGÖZ, 2008).

Many aspects of success story in the 2000’s began to change sharply around 2013 in Gezi protests, which started on May, 28 2013 in Istanbul Gezi Park by anti-government groups and created a widespread chaos for about 15 days. It was also a proof of vulnerability of Turkish economy. The effects on country’s finance and economy were long lasting and destructive. The direct costs around 1.4 billion dollars. Within one mounth, 8 billion dollars foreign investment outflow was observed. BIST indices lost 30% within the subsequent three months. USD/TL Exchange rate, interest rates, inflation and unemployment rates increased. Turkey was trapped in such a political turmoil to a tightining period of the US Federal Reserve's (Fed) expansion policy.

Due to December 17, 2013 Operation, which was an investion by the Public Prosecutor as corruption and bribery probes. Many people including statesman, bureaucrats, bank managers, public officials and sons of ministers were taken in custody. Afterwards, it was claimed as an Initiative to Military Intervention to the Government. BIST fell down, a sharp rise in the prices of Dollar, Euro and gold emerged, and Turkey Republic Central Bank Monetary Policy Committee increased the interest rates more than expected, as consequences of this operation.

After the failed military coup attempt by a fraction in the Turkish army in 2016, US Pastor Andrew Brunson was sentenced 38 months in prison due to taking part in the failed coup attempt. As a US retaliation, Mehmet Hakan Atilla-a bank executive was arrested in Newyork in March 2017 due to helping Iran to evade US sanctions. Turkey faced with sanctions, imposing 50 percent tariffs on Steel imports by Turkey, and Turkey was removed from the Generalized System of Preferences (GSP). In 2018 Turkey’s purchase of an S-400 missile defense system from Russia; and US-backed Kurdish forces in Syria flared tension between US and Turkey. It resulted in new sanctions and removal of Turkey from the US F-35 stealth fighter program. Moreover, the country was one of the most notable victims of the global financial tightening in 2018. The country suffered a currency crisis followed by a recession due to depreciation against US Dollar (USD) by 31 per cent.(Akcay, Güngen, 2019). In fact, Turkey is an exchange rate-sensitive country for decades and unexpected Exchange rate volatilities caused important recessions and crises (Demir, 2019) . The country underwent three severe currency crises in April 1994, February 2001 and October 2008, and a high depreciation episode in May 2006 (Ari, 2012).

Instability-driving factors behind crisis-prone characteristic of the country’s economy

Factors causing instability include chronic current account deficit, high external deficit, fluctuations in FDI, high scale dollarization, inadequate saving rates contributing to the country's economy's crisis-prone nature.

Turkey, as being a net importer of energy, has a chronic current account deficit and therefore high external debt especially due to its energy dependence on foreign countries. Between 1970 and 2017, Turkey's external debt was on average 36.19 percent of GDP (Taskinsoy, 2019).

Inadequate domestic savings is another factor contributing to the country's crisis-prone nature. Within 2002-2015 interval, a substantial drop in domestic saving rate occured as a result of a rapid decrease in the real interest rate (from 21% to 1.8% between 2000 and 2015) and a drastic rise in the access to credit by Turkish households (the ratio of consumer credit-GDP increased from 0.48% to 8.45% in this period.) (Altuğ & Fırat, 2018). Savings were about 24 percent of GDP on average in the 1990s (Akat & Yazgan, 2013). By the end of 2014, domestic savings was 15% of GDP (Altuğ & Fırat, 2018).

Due to current account deficit, external debt and low saving rates, the country rely heavily on external finance to attain economic growth (Ari, 2012). Financial stability in the 2000s resulted in significant financial flows peaking at 9% in the spring of 2011 (Akat & Yazgan, 2013). After capital account liberalization in 1989, the Turkish economy has experienced boom-bust cycles, meaning that an increase in capital flows is followed by an increase in domestic credit and then a consumption-driven boom linked to capital inflows; whereas in case of outflows , the economy contracts (sudden stop), financial crises and deep output contractions become inevitable (Akat & Yazgan, 2013). To alleviate sudden-stop risks, The CBRT adopted a new strategy focusing on containing the adverse effects of the capital flow volatility on the domestic economy in 2010. Financial stability was added as an additional objective to the traditional inflation targeting regime. In the same way, the Financial Stability Comittee was founded in June 2011 as a major step. It brought together all the major relevant institutions for financial stability: Banking Regulation and Supervision Agency, Central Bank, Treasury, Capital Markets Board, and Saving Deposit Insurance Fund. The main duties of the FSC are to assess systemic risks, identify necessary measures and make policy recommendations (Kara, 2016).

High scale dollarization is the result high inflation experienced during the 1990's. Proportion of domestic bank deposits in USD sharply increases especially in financial turmoil times. During the 2001 crisis, the ratio climbed to 62%, before falling to 30 percent by September 2012 (Akat & Yazgan, 2013). Similarly, it rose swiftly in

December 2013. (Mansour-Ichrakieh & Zeaiter, 2019). External debt, combined with widespread dollarization, renders the nation vulnerable to US sanctions and the use of its currency as a means of mass economic destruction during periods of political tension, as seen in the 2018 currency crisis.

Last but not least, external/geopolitical factors such as the Iraq-Syria border conflict, as well as expensive military operations to eliminate terrorists at home and near borders, render the economy fragile (Taskinsoy, 2019).

In summary, the country's economic growth is largely reliant on export earnings and short-term capital inflows. However, this growth strategy go hand in hand with current account deficit. The crucial steps to be taken in order to break this vicious circle and to put the country on a sustainable growth path are: increasing domestic saving level and enhancing productivity to overcome curent account deficit; and deepening financial markets and achieving price stability to alleviate dollarization (Ari, 2012).

2.2 Overview of the Turkish Capital Market

The Turkish capital market is a crucial component of financial system for the efficient allocation of financial resources and enhancement of welfare of the country. It intermediates the transfer of funds between economic agents, from the ones with surplus to those requiring funds. Capital markets provides alternative financing and investment channels to individuals, firms, governments by selling securities such as shares and bonds. The Capital Markets Boards (CMB) of Turkey was established in 1981 to provide transparency and efficient functioning of the markets while also preserving investors' rights. The institution is responsible for developing capital market instruments.

Generally, the capital market deals with long-term investment instrument with maturity longer than a year. Capital market instruments can be classified into the one which use debt-based (e.g. bonds and sukuk) and equity-based (e.g. stocks) contracts. In Turkish bussiness environment, the capital market can be divided into the following markets;

i. Primary market

A market in which new issues of equities and debts are arranged in the form of an entirely new flotation or issue, respectively or in the form of an offer to existing investors. This is to allow the market participants to raise new capital to fund its business operations in exchange of the issuance of securities, either bonds or shares.

A primary market is where securities (share or bond) are issued primarily by the market participants in the form of an entirely new flotation or issue, respectively or in the form of an offer to existing investors.Companies, government or public sector institutions can raise new capital by issuing bond, while corporations can raise new fund by issuing equity. The securities issued at the primary market can be issued in face value, premium value, and at par value.The primary market play the crucial function of facilitating the capital formation within the economy.

ii. Secondary market

Once the securities are set into circulation through the issuance on the primary market, they are the object of transactions on the secondary market. This is to offer possibility to the owners of shares and bonds to capitilize them before they bring a profit (dividends or interests) (Andrieş, 2009).

Figure 2.1 depicts breakdown of The Turkish financial system, which consist of banking institutions, insurance companies and capital market intermediaries. The financial system is dominated by banking sector, which has a nearly 87% share. The system is separated functionally, which means one financial institution can not operate in banking and insurance, and vice versa. Hence, the regulation and supervision is under the area of responsibility of different authorities. Regulatory and supervisory authorities over financial system are TCMB (The Central Bank of Turkey), BDDK (The Banking Regulation and Supervision Agency), and SPK (The Capital Market Board).

The Central Bank's principal goal is price stability, which means keeping inflation rate low enough hence it can be neglectable in economic decisions. The Central Bank's secondary goal is to maintain financial stability. The Bank is in charge of enacting regulatory actions in the money and foreign exchange markets necessary for financial system stability in Turkey

Under the roof of TCMB, credit system is subject to the regulations set by BDDK (The Banking Regulation and Supervison of Agency). The aim of the agency is to ensure efficient running of credit system in a safe and sound manner in line with the Banking Law and other applicable regulations, and to protect rights and interest of savers. Banking institutions, which are governed by BDDK, comprise deposit banks, participation (Islamic) banks. Non-banking financial institutions, which falls under the supervision of BDDK, are leasing companies, factoring companies, development and investment banks, consumer finance companies and others.

SPK, The Turkish Capital Markets Board (CMB) is the country's financial markets' regulatory and supervisory authority. The CMB has been making comprehensive regulations, and developing instruments and institutions for the capital market since 1981. The underlying goals are to ensure that markets operate in a fair and orderly manner, to protect investors' rights, to take the necessary steps to promote the development of capital markets, and to contribute to the effective distribution of financial resources in the country. Regulated by SPK, capital market intermediaries comprise banks, portfolio management firms, brokerage firms, investment trusts and others.

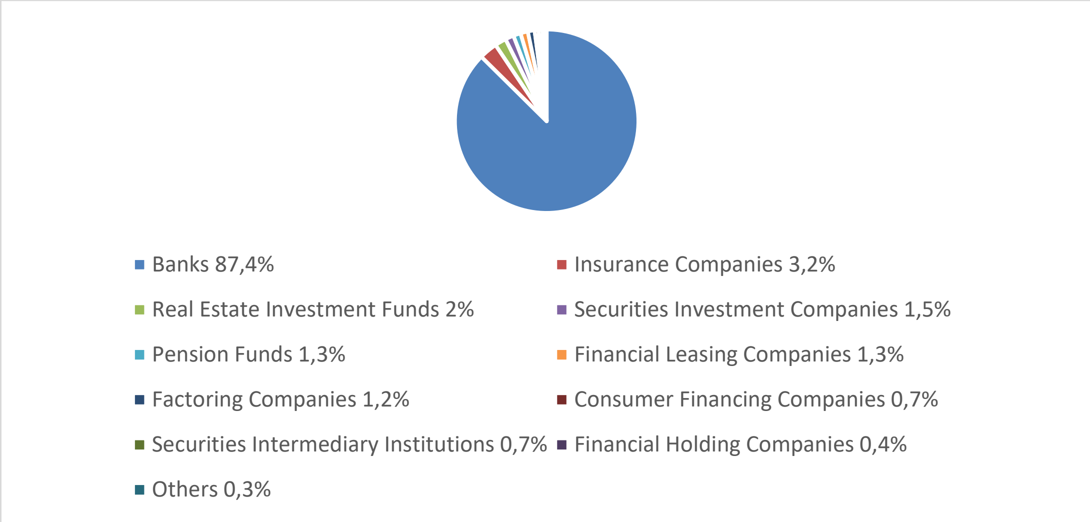


Figure 1 Composition of Turkish Financial Institutions. Source : CBRT

Istanbul Stock Exchange (BIST), which is a fundamental element of capital markets, has been operating since the beginning of 1986. All the exchanges operating in the Turkish capital markets are combined under the single roof of Borsa Istanbul. It has two main markets; stock market and bond market. In stock market, private sector shares, exchange traded funds, securities investment trusts, real estate investment trusts and venture investment trusts are traded. In bond market, public sector bond and bills are traded. The numbers of outstanding securities have rapidly increased since the establishment of BIST and this rapid development makes the Turkish capital market a promising emerging market. By the end of 2020, the market value of the Istanbul Stock Exchange is about 40 per cent of GNP, the number of quoted companies has been reached to 491, with a trade volume of 6594 billion TL.

Table 1 : BIST Indicative Figures

	2018	2020
Number of listed companies	402	491
Market capitalisation (billion TL)	795	1783
Market capitalisation/GSYH %	21,5	40,22
Trade volume(billion TL)	1993	6594

Source: BIST

2.2.1 Development of the Turkish Islamic Financial and Capital Market

Historically, the roots of Turkish Islamic finance can be traced all the way back to 1913, when The Adapazarı Islamic Commercial Bank established. The bank declared that it will continue its activities in accordance with the Shariah principles in the founding contract and operated as an initiative step of Islamic finance in Turkey (Özdemir & Aslan, 2017) (Kutluata, 1970). As the first institutional step taken by the public in the field of interest-free finance in Turkey, DESİYAB (the State Industry Employee Investment Bank) which was founded in 1975 can be mentioned since it operated based on “profit-sharing” principle and aimed to fund the industry without interest by means of the savings of the people, especially the workers abroad (Özdemir & Aslan, 2017) . DESİYAB provided a valuable and preliminary exercise to the development of interest-free banking in Turkey, while not being a full-fledged Islamic bank (Bulut & Er, 2012). On the other hand, the Turkish Treasury issued revenue-sharing certificates (income bonds) based on revenues from the Bosphorus Bridge in 1984 which can be defined as the first exercise in the area of Islamic capital market (Yanpar, 2013). A variety of various debt instruments that are considerable as Islamic were issued subsequently by the treasury (Yanpar, 2013).

Officially, Islamic finance in Turkey dates back to 1985, with establishment of two special finance houses. To increase private savings, which is low in Turkey, and to include idle assets in the financial system were aimed with special finance houses (Kaya, 2018). Special finance houses benefited from the rise of the AK Party and at the end of 2005, the new Banking Act No. 5411 came into force and “Special Finance Houses” were transformed into “Participation Banks”, gaining the “bank” status which has enabled the sector to grow more rapidly. As a side note, essentially due to the strongly secular political environment in the country, Islamic finance institutions and intruments were never officially branded as Islamic (Yanpar, 2013). Worstly, no target for Islamic finance has been set in government programs in order not to trigger secular dynamics till 2014 (Kaya, 2018). Participation banks is driving Islamic finance sector of the country. As of the year 2021, the number of full-fledged Islamic banks has reached to 5, namely Albaraka Türk Katılım Bankası A.Ş.,Kuveyt Türk Katılım Bankası A.Ş., Türkiye Finans Katılım Bankası A.Ş., Ziraat Katılım Bankası A.Ş., Vakıf Katılım Bankası A.Ş.(the last two are state-owned ones). However, Islamic finance sector is not developed and deepened well as the market share of participation banks is nearly 6 percent and deposits are the largest funding source. However, Turkey's financial markets have been on the brink of a significant transition since 2009 and Turkey has put a strong focus on promoting Islamic financial markets in recent years. Takaful company (2009) , Participation index (2011), interest free pension company (2011), leasing certificate by public in USD and TL, establishment The World Bank Global Islamic Finance Development Center (2013) are the examples of developments in Islamic finance sector in this period. The Ministry of Development declared in 2013 that interest-free financial instruments will be developed and diversified, the requisite steps will be taken to raise awareness within 2014-2018 period. As a crucial step, Turkey Wealth fund established as an asset-backed development fund in 2016 with the aim of expanding Islamic finance assets of the country. In the efforts to facilitate the orderly development of the Islamic capital markets in Turkey, more specific objectives are clearly announced in the Eleventh Development Plan (2019-2023) demonstrating the approach of the government to Islamic finance as a strategic sector.

2.2.1.1 Islamic Equity Market

In order to be listed as a Shariah-compliant equity, the Turkish screening methodology consists of quantitative and qualitative assessments through which the company must satisfy both.

From quantitative perspective, the companies whose main activities are one of below non-permissible activities are excluded and can not be deemed as Shariah-compliant:

- Interest-based financing, trade, services, and intermediation,
- Alcoholic beverages, gambling, and games of chance,
- Pork and similar food,
- Tourism, entertainment, press, publication, and advertisement,
- Tobacco products and weapons,
- Futures gold, silver, and currency trade

The contributions from non-permissible activities is restricted to 5%.

From qualitative perspective, required financial ratios to be achieved are mentioned below:

• The rate of total interest-bearing loans of companies to market value should be lower than 30%,

• The rate of interest-bearing cash and securities to market value should be lower than 30%,

(http://www.katilimendeksi.org/content/userfiles/files/ke30_sun um.pdf, Accessed; 13 June 2019).

In other words, interest-bearing cash over total asset and interest-bearing debt over total asset must be 30% at maximum.

There are three Islamic indices active in circulation in Borsa Istanbul , namely Participation 30, Participation 50, Participation Model Portfolio. Participation 30 Index calculation was started as of 06.01.2011, whereas Participation 50 and Participation Model Portfolio started to be calculated first on 09.07.2014.

Participation 30 and Participation 50 indices consist of top 30 and top 50 companies with the biggest public market capitalization complying with Participation index rules, respectively. Whereas, Participation Model Portfolio consists of 13 stocks selected from companies listed in Participation 50, by filtering according to research credit rating score, trade volume, P/E ratio, EV/EBITDA ratio and MV/BV ratio.

The list of Participation 30 and Participation 50 indices are updated in 3 months periods, while the list of Participation Model Portfolio is updated in 15 days periods.

2.2.1.2 Sukuk Market

Sukuk refers to securities or financial certificates of equal value which, through a mixed portfolio of different properties, reflect undivided shares in the ownership of tangible assets, usufructs, services, commodities, or profit-sharing projects, or financial assets, or any combination thereof. Sukuk developed through restructuring traditional capital market debt instruments in accordance with Islamic principles. In other words, sukuk is Islamic investment trust certificate which denotes a portion of ownership in a specific asset, usufruct or service, by means of which Sukuk holders taking the ownership of underlying asset and then getting periodic fixed return and complete redemption at maturity. Shariah legitimacy of sukuk lies mainly in paying profit instead of interest , and generally involving a tangible asset in the investment so that utilization of sukuk proceeds are directly linked to real sector activities. Sukuk, especially ijara type, contributes to economic development in the long run through financing SME' (Yıldırım, Yıldırım, & Diboğlu, 2019) .

The asset subject to sukuk must have a quality that cannot be consumable until its maturity (Ulus, 2013). The contractual structures of sukuk makes it different from conventional bonds (Azmat, Skully, & Brown, 2014).

On the contrary, conventional bonds are financial certificates by means of which investors lend money to the issuer, implying an obligation for repayment at maturity and bondholders receive regular interest payments. As conventional bonds do not have any major investment constraints, they may finance businesses involved in non-Sharia-compliant activities (gambling, alcohol, pork, etc.).

Sukuk has some similarities with shares including right of ownership and no fixed income. However, a sharholder can continue to have the ownership right as long as he desires, while sukuk holder has the right of ownership till the date predetermined at agreement.

Sukuks are effective debt instruments to heal the impact of excessive financialization and interest-sensitive capital movements which are the basic sources of the financial crises and which leads to divergence of money markets and real sectors (BÜYÜKAKIN & KÜÇÜKÇOLAK, 2021).

Sukuk is a very diverse and complex financial instrument. According to The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), the Sukuk certificates can be classified into six classes; Mudarabah(profit sharing), Musharakah(profit/loss sharing), Murabaha(cost and profit share sales), Salam(prepaid sales), Istisna'a, and Ijarah(lease/rental) (BÜYÜKAKIN & KÜÇÜKÇOLAK, 2021) (GÜN, 2020). In line with excess demand, sukuk market met ingenious sukuk structures including green, waqf, blockchain, and gold-based sukuk in recent years(TKBB,2019).

Islamic banks, who have a restricted product range in today's interest-based financial structure, are the main investors of Sukuk as a basic investment and liquidity management tool (GÜN, 2020) (Ulusoy & Mehmet, 2018).They meet their short or long-term liquidity needs by making sukuk issues, or invest their liquidity surpluses in sukuk of other institutions. Sukuk is also used by conventional banks for portfolio diversification purposes (Ulusoy & Mehmet, 2018).

According to AAOIFI, Sukuk may be tradable or not tradable according to the type of the governing contract, or arrangement, as well as, the nature of the underlying assets or business. Weak secondary market of sukuk, which is the main impediment to liquidity of sukuk market, is the result of tradability restrictions of Islamic law for some types of sukuks, hold-to-maturity culture, scarcity of supply, lack of standardization at international level, lack of well-developed global trading platform, low ratio of sukuk rated by rating companies and listed on global stock exchanges, low number of retails investors, and lack of global international Islamic banks (Ulusoy & Mehmet, 2018).

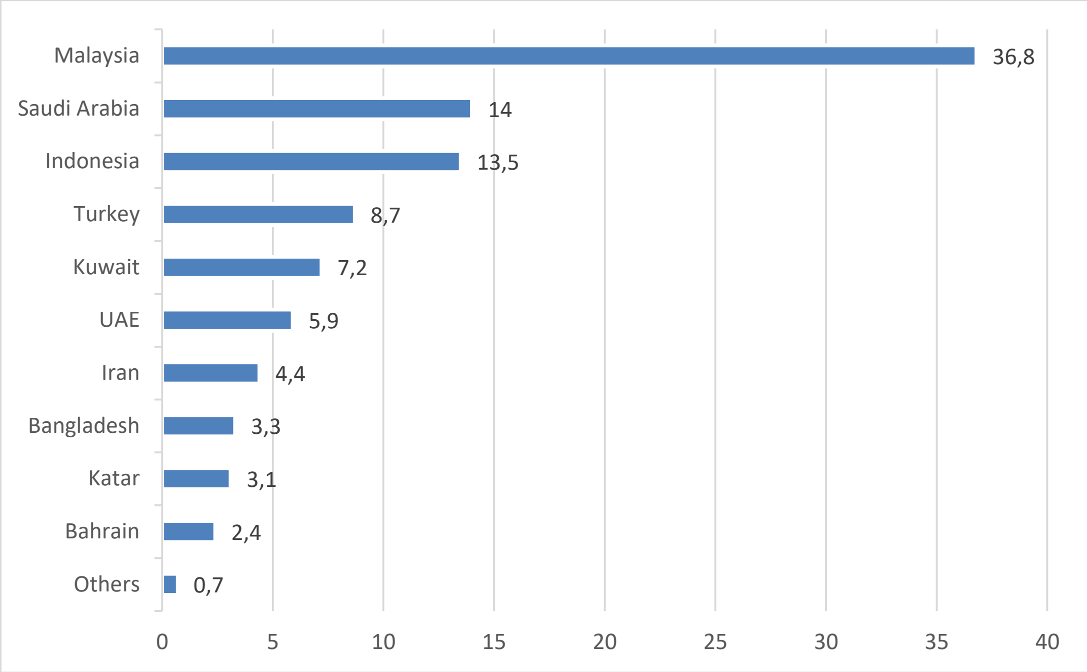
Between 2001 and 2019, sukuks were issued in 35 different countries around the world. 2018 saw a total of USD 125 billion in global Sukuk issuances.; the government sukuk issuance was 54% of this amount, while public institutions contributed 18% (TKBB, 2019). Malaysia keeps it leading position in sukuk market since the first issue in 1996, mainly with murabaha sukuk issuances. Malaysia is followed by Turkey, Indonesia, Bahrain, Gambia, and Brunei Darussalam (Ulusoy & Mehmet, 2018).

The Board of Capital Markets published the first communiqué regarding sukuk (lease certificates) in Turkey on April 1, 2010 so that it paved the way to Sukuk issuance by financial institutions and companies in Turkey. In January 2011, legal exemptions related to Sukuk similar to the conventional bonds were regulated (GÜN, 2020). The first sukuk was issued by Kuveyt Turk Participation Bank at the end of 2011, with value USD 100 million, fixed return of 5.25%, and maturity date August 2013. It is followed by the first sovereign sukuk in 2012 of total volume USD 1,5 billion.

The Ministry of Treasury and Finance and the Capital Markets Board of Turkey (CMB) promulgated regulations on sovereign Sukuk and Sharia-compliant investment funds respectively in 2012, which were two milestones in the context of Islamic finance development (Pirgaip, Arslan-Ayaydin, & Karan, 2020). Therefore Sukuk has emerged as an alternative investment option as a result of both regulations. Corporate sukuk issuances were followed by sovereign sukuk. The treasury raised a successful sovereign sukuk in 2012 of total volume US$1.5 billion. Five times demand was obtained at the first tender, and breakdown of investors according to residency were as follows : Middle East 58%, Europe 13%, Asia 12%, Turkey 9%, USD 8% (Halıcı & Halıcı, 2013).

The Turkish sukuk market has been steadily expanding altough a bit late entrance to the market. Through sukuk issuance, it is possible for Turkey to lure Gulf capital, which has immense potential, and ultimately to increase market share in the global sukuk market. The total amount of sukuk issued in Turkey (by the Turkish Treasury and the asset lease companies of participation banks) was TL 32.4 billion (USD 5.42 billion) in 2018 (TKBB, 2019). According to the Islamic Financial Services Board (IFSB), Turkey has an 8.3% market share and was ranked as the fifth sukuk issuer in 2018 in global sukuk market (TKBB, 2019). In 2019, government bonds accounted for 65 percent of the securities portfolio, while Eurobonds sold by the Treasury accounted for 22 percent and sukuk accounted for 5 per cent (TKBB, 2019). To obtain a greater share in sukuk market, Turkey has to eliminate the legislative deficiencies and to diversify sukuk types in order to increase capital transfer from abroad. Additionally , in order to prevent captial outflow, awareness in domestic market has to be rasied (BÜYÜKAKIN & KÜÇÜKÇOLAK, 2021).

Turkey has developed gold-backed sukuk which is a cost effective alternative of sukuk structure so that the states can collect idle assets and deepen their domestic financial market.In October 2017 the first gold-backed sovereign sukuk was launched. It's a kind of ijara sukuk based on physical gold. The idle gold assets more than 3,500 tons from households came into circulation in the financial system and contributed to government reserves. The principal is paid out in physical gold coins, and the tax-free dividends are paid out in Turkish Liras.



Source: STATISTA

Figure 2 : Global Sukuk Issuance Percentage by Country in 2019

2.3 Overview of The Turkish Commodity Market

The first organized commodity derivative exchange in Turkey dates back to 2005, with the foundation of İzmir Derivative Exchange (TURKDEX/VOB). The commodity derivative exchanges major function is to develope commodity market through price discovery, physical trade, reduction of price risk and transaction costs, diversification for financial investors (Rashid, 2015). Wheat and cotton, which have a strategic importance for Turkey as being one of the top ten producers in the world , were among the earliest contracts used (Kayhan & Abdurrahman, 2017). In 2012, The Derivatives Market (VIOP) began to operate in 2012, first providing trading of USD-TL futures contracts under the roof of Borsa Istanbul. The merger of İzmir Derivative Exchange (TURKDEX/VOB) and BIST Derivatives Market (VIOP) was fully completed in 2013. Therefore Turkish derivative products became more accessible to both domestic and foreign traders. By 2014, Istanbul Settlement and Custody Bank Inc. started to serve as VIOP's Central Counterparty. Now, all futures and options transactions are placed on the single platform of VIOP. Anatolian red wheat, durum wheat, aegean cotton futures are commodity futures that are actively traded on The Derivatives

Market (VIOP) of Borsa Istanbul, together with equity and financial derivatives including single stock, index, foreign currency, energy, precious metals, foreign index, metal and TLREF. In March 2017, Borsa Istanbul and NASDAQ OMX announced a strategic alliance.

In order to functioning effectively, financial markets depends on two pillars: one is forward market and other one is spot market (Bağcı, H., 2004). In fact, an active spot market is one of the major pre-requisites for a well-functioning derivative market (Kucukcolak, 2019).Turkish localized commodity exchanges for spot agricultural product trading provide decentralized platforms in various Turkish cities. There are 113 commodity exchanges all around Turkey. To securitize agricultural commodity market, The Agricultural Products Licensed Warehouse Act. No. 5300 enacted on February 10, 2005. The licensed warehouse system enables to store standardized commodities and offers financing facilities without selling the commodity. The first licenced warehouse was founded in 2010. By the end of 2020, number of licenced warehouses reached to 126. This paved the way for the regulatory framework of Electronic Warehouse Receipt (EWR), which is also known as electronic product security. In 2013, the first EWR was released for cotton, and followed by barley and wheat in 2014. The most active EWRs are wheat, cotton, barley, and corn (Kucukcolak, 2019). As a key milestone for spot commodity market is the launch of Turkish Mercantile Exchange Incorporate (TME) in 2019, following a series of merger. As a result, all transactions of EWR's are carried on the single platform of TME, without the need for physical relocation. TME's primary goal, in conjunction with the licensed warehousing system, is to prevent price speculation in the commodity markety. Within one year period, transaction volume and transaction amount increased to 11.4 billion liras and 7.2 million tons, respectively. There are almost 80,000 investors registered to the platform. The goverment apply incentives like tax exemption for investors and interest-free loan opportunity for farmers.

Beside wheat and cotton; barley,corn, soybean, oat, lentil, sunflower, paddy, bean, hazelnut, olive are among the agricultural products stored by licensed warehouses. In fact, Turkey is one of the major producer and exporter of agricultural products as being the 8th largest agricultural economy in the World (Aytop, Çukadar, & Şahin, 2014). In 2019, total agriculture and food industry exports totaled US$ 19.7 billion, accounting for roughly 10.9 percent of Turkey's total export value. However, only wheat and cotton derivatives are traded in derivative market. The derivative market VIOP became one of the prominent markets in a short span of time, foreign currency and interest futures are the main derivates mostly traded. Proportion of futures with underlying wheat and cotton are relatively very low in trading volume. It can be said that Turkish commodity derivative market is hasn’t fully demonstrated Turkey’s potential.

CHAPTER III

LITERATURE REVIEW

Modern Portfolio Theory by Markowitz (1952) is one of the most influential and revolutionary economic theories which guides investors how perceive risk, return and portfolio management. MPT assumes that investors are risk-averse and risk has two components : systematic and unsystematic. There is no way to be exempt from systematic risk like wars, recessions, interest rates, whereas unsystematic risk is specific to individual stocks like change in management or decline in operations. Rational investors can reduce or eliminate overall unsystematic risk and optimize or maximize expected return through a well-diversified portfolio, instead of holding individual stocks, by using a quantitative method. In other words, if you increase number of stocks in your portfolio, unsystematic risk can be diversified away. But investors are still expose to systematic risk even if they hold all the shares in the stock market. As a way to measure this systematic risk, William Sharpe (1970) founded The Capital Asset Pricing Model (CAPM).

Grubel (1968) and Levy and Sarnat (1970) extended MPT to international investment context, and documented that internationally diversified portfolios outperformed domestic-only ones in return due to low correlation among cross-country stock markets. Moreover, according to Dwyer and Hafer (1988), there is no link among the levels of stock prices across national markets. Therefore risk reduction might be facilitated by diversifying portfolios between different countries. Driessen and Laeven (2007); Chiao et al. (2008) studied both regional and international diversification benefit and founded that domestic investors will gain more diversification benefits by investing abroad rather than within-region.

On the other hand, global stock market integration is a reality of today's world after liberalization and frequent economic crisis in recent times. Interdependency and comovement tendency among national stock markets has become salient due to complete freedom of capital movements, and rise of multinational corporations. It is empirically examined in academic world and quantified that potential for diversification is substantially mitigated. High cointegration means high correlation in return, and thus consequently decreases diversification potential. However international diversification benefit can still be achieved as return correlation between markets is not constant, instead vary over time. Thus, it is not possible to claim perfect integration among stock markets. Diversification still make sense as long as correlation is not perfect (positive and lower than 1). Furthermore, country-specific factors like differing fiscal and monetary policy cycles, and also currency fluctuation historically made return-generating mechanisms unique for each county. Furthermore diversification can still be beneficial if one mix stocks from countries of different levels of economic maturity(developed, emergent and frontier) (Berger, Pukthuanthong, & Yang, 2013) Gupta et al., 2011) and of different regions of the world in their portfolio.

Trade increases integration and volatility spillover between markets. On the other hand, trade opennes and economic growth are positively correlated acc. to Arora and Vamvakidis (2005), who empirically quantified the impact of growth rate and relative income level of trading partners on a country's growth rate, by estimating a time series of trade weights over the period 1960–1999 for 90 countries. The results demonstrated that a 1 percent increase in growth among a country's trading partners leads to a 0.8 percent increase in domestic growth of that country in turn. In other words, investing in trading partners contribute to home country growth. Moreover, altough the potential benefits of international diversification are proved and widely known, it is well documented that majority of people tend to invest within domestic or familiar region, which is known as the home country bias, due to preference for the familiar (Huberman, 2001) (Grinblatt & Keloharju, 2000)Information assymmetries play an important role to explain the bias in portfolio building (Ackert, Church, Tompkins, & Zhang, 2005). Home country bias can be extended to trading partner countries and majority of people may tend to invest in familiar trading partners, instead of the unknown countries.

Futhermore, Muslim investors have a restricted investment universe due to Shariah screening and have limited diversification opportunities. International diversification can mitigate risk and improve return level. Therefore, the aim of this study is to provide recent empirical findings for international diversification benefits for Turkey-based conventional and Islamic equity investors among top trading partners.

2.1 Review of Literature from Methodological Perspective

Measuring comovements among stock market returns has implications for market players and academicians in terms of portfolio diversification issue. The most common method for measuring stock market comovements is linear correlation (Pearsons correlation coefficient) (Dajcman, Festic, & Kavkler, 2012), which may be inconsistent with reality (Longin & Solnik, 1995). Actually, the correlation between stock returns can be non-linear or time-varying (Mimouni & Charfeddine, 2016) (Xiao & Dhesi, 2010). In this case , some sophisticated econometric methods are usually used to measure the level of stock market comovements and correlation coefficients including Engle’s (2002) pathbreaking work Dynamic Conditional Correlation Multivariate Generalized Authoregressive Conditional Heteroscedasticity (MGARCH DCC) model . It was introduced as a new class of estimator to overcome the limitation associated with the Bollerslev (1990) CCC-model, which is the constant conditional correlation estimator . As it functions as a substantial tool in a variety of financial fields including asset pricing, portfolio selection, and risk management, MGARH DCC has a wide range of application (Saiti, Bacha, & Masih, The diversification benefits from Islamic investment during the financial turmoil: The case for the US-based equity investors., 2014). The advantages of MGARCH DCC include :

(i)The merit of MGARCH DCC lies in its ease of implementation with very strong empricial performance (Engle R. , 2002).It makes process of estimating time-varying correlation matrix straightforward. It is an easy to compute correlation estimator (Engle & Sheppard, 2001). ;

(ii) MPT assumes that the portfolio variances are normally distributed, which seemed inadequate measure of risk by Markowitz himself. Fat-tailed distributions are closer to real world data. MGARCH DCC has the ability to adopt a student-t distribution of variances, which is more useful in capturing the fat-tailed nature of the distribution of index returns (Pesaran & Pesaran, 2009)

(iii) The number of parameters to be estimated in the correlation process is independent of the number of the time series to be correlated, therefore solves dimensionality problem (Engle R. , 2002).Therefore, it permits to analyse dynamics of return and volatility spillovers accross a wide range of markets during financial turmoil periods (Billio & Caporin, 2005) (Dajcman, Festic, & Kavkler, 2012)

(iv)It guarantees that time varying correlation matrix between market returns are positive definite (Gallegati, 2014) and It ensures the positive definiteness of variance covariance matrix at each point in time (Belasri & Ellaia, 2017),

(v) It measures direction and strength of the correlation, and models the evolving nature of volatility concurrently (Lebo & Box-Steffensmeier, 2008). In other words, It is a useful model for determining how asset volatility and correlation change over time, as well as the direction (positive or negative) and scale of the changes (stronger or weaker) (Saiti, Bacha, & Masih, 2014).

(vi)Since it continuously adjusts the correlation for the time varying volatility, it is free from any bias from volatility (Cho & Parhizgari, 2009).

(vii) Even using standard univariate GARCH specifications, DCC performs better in terms of portfolio allocation among the families applicable to large panel models and therefore is more powerful than the constant correlation estimator developed by Bollerslev (1990) (Sclip, Dreassi, Miani, & Paltrinieri, 2016).

(vii)It offers both the flexibility of univariate GARCH models and the simplicity in parameterizing the conditional correlations (Swaray & Hammad, 2009).

One strand of empirical literature utilizing MGARCH DCC method is comparative studies between Islamic and conventional stock indices. The underlying motivation of such studies is generally to check hedging capacity of Islamic indices. In this manner, Arshad and Rizvi (2014) revealed that Islamic equity can offer partial insulation during crises.. Kamil, Bacha, and Masih (2014) analysed Dw Jones 23 sector indices, of which 16 are Shariah compliant and 7 are conventional, covering 1997-2013 period by using efficient frontiers, timevarying maximum Sharpe ratio, dynamic correlation coefficients (DCC) in a multivariate generalized autoregressive conditional heteroscedastic (MGARCH) framework, and computing residual variances and subsequent analysis of covariance (ANCOVA) and revealed that Islamic investment universe is not poor in terms of diversification opportunities at international level. It can even outperform the conventional one under certain circumstances. El Mehdi and Mghaieth (2017) studied dynamic conditional correlation between Islamic and conventional stock indices, namely six Dow Jones Islamic indices and their conventional counterparts. Both univariate and multivariate GARCH type models were adopted for the period 2000–2014. The findings revealed that Islamic indices in a conventional stock portfolio increases the risk-adjusted performance of the resulting portfolio. (Trabelsi & Naifar, 2017) Trabelsi and Naifar (2017) also found supportive results that portfolios including Islamic stock indexes perform better than a benchmark

portfolio in turmoil periods. Ali et al. (2020) performed a comparative study by using MGARCH DCC between Islamic equity and Socially Responsible Investment (SRI) equity, which has also shown remarkable growth in recent years. There exist a hedging potential between the two, especially in shorter investment horizon. Ahmad et al.(2018) found that during the global financial crisis (2008) period, the DJIMI shows the patterns of decoupling from conventional benchmark indices, which suggests that Islamic equity index may act as an effective hedging instrument during the crisis period. On the contrary, Yilmaz (2015) implemented dynamic conditional correlation (DCC) and dynamic equicorrelation (DECO) on Dow Jones Islamic Market sector indexes and found that Islamic equity sectors are integrated as in the conventional system. The results do no support decoupling hypothesis of Islamic indices from the mainstream indices. Saiti, Nagayev, and Yumusak(2019) explored that Islamic indices are less volatile than the Chinese conventional sectoral indices by deploying MGARCH-DCC. Therefore it is concluded that there are dievrsisication benefits when Islamic indices are inculuded in portfolios for Chinese conventional investors.
Islamic equity and commodities were studied comparatively as another strand of literature. For example, by means of MGARCH DCC and the filter of Kalman models, Mezghani and Boujelbène (2018) studied oil market and GCC Islamic and Conventional stock markets and displayed that there exist contagion effects between the markets. Similarly, Abdulkarim et al. (2020) investigated volatility linkages between crude oil and African Islamic indices by employing MODWT, CWT, and multivariate-GARCH-DCC techniques. From their results, investors holding the Tunisian and the Egyptian Islamic indices with oil can get maximum diversification benefit in long term periods.

Diversification potential among Islamic indices cross countries has been a focus of interest by academic world to orient Islamic equity investors into investment alternatives at international level. For Malaysia, Hakim and Masih (2014) used MGARCH DCC together with wavelet transform to catch time-varying correlation and time scales, respectively. The study revealed potential gain is possible from portfolio diversification both at international and domestic sectoral level. Another case study for Malaysia is the one by Najeeb et al. (2015). M-GARCH-DCC, Continuous Wavelet Transforms (CWT), and Maximum Overlap Discrete Wavelet Transform (MODWT) are the tecniques used to determine international portfolio diversification opportunities for investors having heterogeneous investment horizons. Rahim and Masih (2014) also adopted MGARCH DCC to detect diversification benefits for Moroccon Islamic investors during political uncertainty, which is Arab Spring. Rahim and Masih (2016) applied Multivariate GARCH Dynamic Conditional Correlation, the Continuous Wavelet Transform and the Maximal Overlap Discrete Wavelet Transform to evaluate diversification strategies for Malaysian Islamic stock investors with their top trading partner countries by taking into account time varying correlations and different investment horizons. There are also practical implications for Saudi Arabia-based invertors in the study by Ali et al.(2019) through MGARCH DCC and continuous wavelet transforms. It is explored that diversification is possible with major trading partners in short-term investment horizons, altough the highest potential exist with India and the least is with China. Joyo and Lefen (2019) investigated time-varying correlation and volatilities of stock markets of Pakistan and its trading partners by employing MGARCH-DCC with student t-distribution, for the period of 2005 to 2018. The results revealed that it is not possible to diversify portfolios for Pakistani investors with its trading partners during 2008 global financial crisis.

2.2 Review of Literature from Empirical Perspective

Integration and volatility spillover are important decisive factors in asset allocation of international investors in order to obtain an optimal portfolio with minimum unsystemic risk. In fact, high integration and existence of volatility spillover lower diversification potential since the market is not isolated and vulnerable to external shock (Bekaert & Harvey, 2000). Furthermore, extreme volatility means uncertainty for foreign investors, which is undesirable (Darrat & Benkato, Interdependence and volatility spillovers under market liberalization: The case of Istanbul stock exchange, 2003). By the capital account liberalization of Turkish financial markets in 1989, domestic firms are able to reach capital in lower costs (Darrat & Benkato, Interdependence and volatility spillovers under market liberalization: The case of Istanbul stock exchange, 2003). Foreignors are permitted to buy and sell all types of securities in IMKB (the earlier name of BIST) after this decision. However it is an issue on debate if excessive volatil (Gürsoy & GOVDERE, 2020)ity of the market is due to high integration and interdependence, which gained momentum in the last decades due to globalization and high speed of information flow by means of high technology. In this section, we present a review of previous GARCH-based works concerning the integration of the Turkish equity markets with the equity markets of other nations.

Çemrek and Polat (2021) processed multivariate GARCH models on daily stock index data between 2005 and 2011 from seven countries of high trade volume (Germany, France, UK, Russia, China, United States of Amerika and Italy) and seven countries of low trade volume (Botswana, Gabon, Kenya, Southern Cyprus, Iceland, New Zealand and Jamaica) with Turkey. According the results, trade facilitates transfer of volatility to Turkey.In the same manner, Simi (2021) analyzed Volatility Spillovers between Kazakhstan, Turkey, Poland and Russia using univariate AR-EGARCH model and confirmed the presence of volatility and volatility spillovers in all the examined indexes. Trading volume and exchange rate also have an impact on the indexes and their volatility spillovers in most of the cases. Gursoy and Govdere (2020) run multivariate VAR-EGARCH model mean equation on daily data between 2006-2017 period in order to detect return and volatility spillover from develepod countries including US, UK, Japan, Germany, France, to developing countries including Turkey, Brasil, India, Indonesia, South Africa. According to the results, there is a strong spillover from UK, Japan,US equity markets to the developing ones, whereas France and UK are the sources of volatility spillover. The volatility flows in other countries has the least impact on Turkey. With the aid of Hafner and Herwartz (2006) variance causality test and DCC multivariate GARCH method, Senol and Turkay (2020) tested volatility spillover between developed markets (USA, United Kingdom, Japan, Germany) and emerging markets (China, Russia, Turkey, Brazil) by using daily data of 03.01.2000 – 28.12.2017. China is the only market that does not receive volatility, and USA, Japan, Germany, Turkey and Brazil are the net receiver of volatility flows. Buriev et al. (2018) applied MGARCH-DCC and Wavelet methodologies to examine availability of diversification benefits for Turkey-based conventional investors in MENA countries , namely Turkey, Egypt, Lebanon, and Oman using Daily data between 2005 and 2015 in different investment horizons. According to the findings, the major trading partners of the country, especially Egypt, within the region do not offer diversification potential due to interconnectedness of the related markets for all investment horizons. Değirmenci ve Abdioğlu (2017) analyzed stock market spillover between United States, Canada, China, Japan, South Korea, Germany, Britain, Switzerland and Greece to the fragile eight countries (Brazil, India, Indonesia, South Africa, Turkey, Hungary, Poland and Chile). According to the results obtained by E-GARCH model on weekly data between 2006-2015, there is volatility spillover from the developed markets to the fragile eights. In order to measure return and volatility spillover between Turkey, Germany, France, UK, Demirgil ve Gök (2014) used VAR-EGARCH model on daily data between 2002-2013. In terms of both retun and volatility, Germany is the dominant country in terms of volatility spillover. Depending on daily data between 1995-2007 and using ARCH, GARCH models ,the research conducted by Yalama (2008) indicatad that Turkey stock index returns have higher return volatility compared to UK, Netherland, Germany, US, France equity markets. Yu ve Hassan (2008) applied EGARCH and multivariate ARCH models with daily data between 1999-2005 and concluded that shocks originating from US equity market cause excessive volatility in Turkey within the period studied. By using DCC ARCH-M and GARCHM on Daily data between 2003-2007, Alemdar (2010) also supported this finding. On the contrary, AbouZaid (2011) emphasized that the Turkish stock market is not affected by the US and UK markets byt their study with the aid of multivariate E-GARCH on daily data between 1997-2007. Return spillover among US, Germany, France, UK and Turkey equity markets are studied by Taştan (2005) by means of VAR-DCC MVGARCH models with Daily data between 1990-2004. It is concluded that Turkey is under a significant volatility spillover partiularly after the customs union agreement. In the study done by Darrat and Benkato (2003) using Johansen-Juselius cointegration test and GARCH process and covering monthly data from Turkey, US, UK, Japan markets between 1989-1998 period, it is proved that Turkey is receiver of volatility shocks from US and UK. In general, all the studies highlighted that Turkey is integrated with and affected by volatility spillover originating from its trading partners.

Another strand of literature consists of the studies regarding Turkish Islamic equity market integration at international scale. The first study applying Multivariate GARCH DCC approach in order to evaluate diversification potential of Islamic investment for US-based investors in financial turmoil is performed by Saiti et al. (2014). In comparison to Korea, Hong Kong, China, and Turkey, the analysis found that both conventional and Islamic equity markets of Japan, the Gulf Cooperation Council (GCC) ex-Saudi, Indonesia, Malaysia, and Taiwan are less correlated with US equity market . US-based investors may obtain less diversification benefits from having Islamic stock indexes in their investment portfolio than their conventional equivalents. A similar study was conducted by Majdoub and Mansour (2014) where MSCI Islamic indices of US, Turkey, Indonesia, Pakistan, Qatar, and Malaysia are studied by means of multivariate GARCH BEKK, CCC, and DCC models and it is revelaed that there exists a weak correlation between US and Islamic emerging equity markets .

Gandapur (2020) analyzed volatility spillover from global volatility Index (VIX) to the equity market of selected Islamic countries through ARMA GARCH, GJR GARCH,DCC and ADCC methods on daily data between 2000 and 2019. MSCI Turkey IS and BIST National 100 indices are taken into account. The author indicated that any movement in VIX has a negative impact on the Borsa Istanbul Stock Exchange's volatility. Furthermore, negative news causes more volatility than positive news.

As a separate class , studies comparing Islamic and conventional stock indices can be mentioned. Anas et al. (2020) processed wavelet and ADCC methodologies on daily data for a quite large sample consisting of 41 countries, including Turkey. A substantial positive correlation in short ivestment horizons is detected between Islamic and conventional equity retuns, therefore decoupling hypothesis failed.

At country level, Erdogan et al. (2020) analyzed at how traditional and Islamic stock markets responded to the Covid-19 outbreak in Turkey. The researcher applied the DCC-GARCH method by using the daily data from Feb 10, 2011 to Sep 02, 2020 and empirically demonstrated that the Turkish Islamic stock markets are more resiliant to the global Covid-19 outbreak than the conventional counterpart. Kahyaoğlu and Akkuş (2020) measured volatility spillover between Islamic and conventional indices, namely Participation-30 and BIST-30 relatively by using Dynamic Equicorrelation (DECO) and HYGARCH models. Findings revealed that correlation between the two is strong, meaning no room for hedging.

Secme et al. (2016) analyzed performance of BIST-100 and Participation-30 indices in terms of volatility and return with the help of GARCH(1,1) and EGARCH(1,1) methodologies. The authors obtained that Participation-30 index is less volatile and has a higher return performance. The study also examined correlation between Participation 30 Index, Dow Jones Industrial Average and Dow Jones Islamic Market, and exhibited a poor correlation between Participation 30 Index and Dow Jones

Islamic Market, suggesting existence of diversification potential for Turkey-based Islamic investors at international level.

As seen from above literature review, diversification potential in trading partners for Turkey-based Islamic equity investors has not been studied yet. This study mainly inspired by and follows the work of Saiti et al. (2014) and Noordin (2016), albeit from the perpective of Turkey-based Islamic investors to fill in this gap in the literature and to give fruitful insights to Turkey based conventional investors with actual data.

CHAPTER IV

RESEARCH METHODOLOGY

3.1 Multivariate GARCH-dynamic conditional correlation

The multivariate generalized autoregressive conditional heteroscedastic dynamic conditional Correlation (MGARCH-DCC) model of Engle (2002) will be deployed to estimate time-varying volatilities and correlations amongst stock indices.

The model consists of two steps estimations. First, the conditional variances of each asset is estimated by means of the following univariate GARCH (X,Y) model:

$$h_{it} = \omega_i + \sum_{x=1}^{X_i} \alpha_{ix} r^2{}_{it-x} + \sum_{y=1}^{Y_i} \beta_{iy} h_{it-y} \text{, for } i = 1,2,\dots,\text{k}$$

where ω_i, α_{ix} and β_{iy} are non-negative and $\sum_{x=1}^{X_i} \alpha_{ix} + \sum_{y=1}^{Y_i} \beta_{iy} < 1$.

α_{ix} denotes shocks to return X to a short-run persistence (the ARCH effects) and β_{iy} is the contribution of shocks to return Y to a long-run persistence (the GARCH effects), k represents the number of assets.

At the second step, the time-varying conditional correlation between index returns will be calculated by using the general equation of the DCC estimator :

$$H_t = D_t R_t D_t$$

H_t denotes multivariate conditional covariance matrix,

D_t represents a kxk matrix of conditional time-varying standardized residuals(ε_t), which were generated from the univariate GARCH model at the first step.

$$D_t = diag\left(\sqrt{h_{11,t}}\,, \sqrt{h_{22,t}}\,, \dots, \sqrt{h_{kk,t}}\ \right)$$

It is a symmetric positive definitive matrix having $\sqrt{h_{ii,t}}$ on its diagonals, I=1,2,…k.

R_t stands for time-varying correlation matrix (off-diagonal elements).

$$R_t = Q_t^{*-1}\ Q_t\ Q_t^{*-1}$$

$Q_t = (q_{ij,t})$ is derived from;

$$Q_t = (1-\ \phi - \gamma)\ \bar{Q} + \gamma\ Q_{t-1} +\ \phi\sigma_{i,t-1}\sigma_{j,t-1}$$

the k x k symmetric positive definitive matrix,

Where Q_t is a k x k *symmetric positive* definitive conditional (time-varying) covariance matrix of standardized residual $\left(\sigma_{it} = \frac{\varepsilon_{it}}{\sqrt{h_{it}}}\right)$ and $\bar{Q}$ is the unconditional correlations of $\sigma_{i,t}\sigma_{j,t}$. ϕ and γ are non-negative scalar parameters satisfying $\phi + \gamma < 1$. Q_t^* is the diagonal matrix consisting of the square root of the diagonal elements of Q_t:

$$Q_t^* = diag\left(\sqrt{q_{11}}\,, \sqrt{q_{22}}\,, \dots, \sqrt{q_{kk}}\ \right)$$

Hence, the conditional correlation of X and Y stock indices at time t can be calculated as follows;

$$\rho_{ij,t} = \frac{(1-\ \phi - \gamma)\bar{q}_{ij} + \phi\sigma_{i,t-1}\,\sigma_{j,t-1} + \gamma q_{ij,t-1}}{\left[(1-\ \phi - \gamma)\bar{q}_{ii} + \phi\sigma_{i,t-1}^2\ + \gamma q_{ii,t-1}\right]^{1/2}\left[(1-\ \phi - \gamma)\bar{q}_{jj} + \phi\sigma_{j,t-1}^2\ + \gamma q_{jj,t-1}\right]^{1/2}}$$

Where q_{ij} is the element on the i^{th} line and j^{th} column on the matrix Q_t. (Bollerslev, 1988)*By the* Bollerslev (1988) model, the conditional log likelihood of the parameters based on the Gaussian assumption can be summarized as follows;

$$L = -\frac{1}{2}\sum_{t=1}^{T}[(k\log(2\pi) + \log|D_t|^2 + \varepsilon_t' D_t^{-1} D_t^{-1}\varepsilon_t)$$
$$+ (\log|R_t| + \sigma_t' R_t^{-1}\sigma_t - \sigma_t' \sigma_t)]$$

where k denotes the number of equations a, whereas T denotes the number of observations. In step 1, only the volatility component (D_t) is maximized , i.e. the log likelihood is reduced to the sum of the log likelihood of univariate GARCH model. On the other hand, in Step 2, the correlation component (R_t) is maximized (conditional on the estimated D_t) with the standardized residuals obtained from Step 1. The use of Gaussian assumption in holding for daily returns is a controversial issue as it results in an underestimation of portfolio risk. In fact, despite of consistency under the two-step estimation of the likelihood approach (Engle & Sheppard, 2001) , it could possibly be inefficient under Gaussianity (Pesaran & Pesaran, 2010)

3.2 Data

Daily time series closing price data for a period of approximately 13 years starting from 29 January 2008 to 22 January 2021 are collected, therefore it is possible to see the evolving pattern of daily time-series. Thomson-Reuters DataStream database is the source of all data.

As the proxies for conventional and Islamic stock returns, the MSCI Turkey index returns and the MSCI Turkey Islamic index returns are used respectively since MSCI has the most though criteria for companies to be included in its index (Majdoub &

Mansour, 2014). The MSCI conventional and Islamic index returns of the top trading partners of Turkey namely; Germany, United Kingdom,Italy, United States, France, Spain, Netherland, and Russia are taken into account to unveil potential diversification benefits for Turkey-based equity investors . The countries are chosen as they are the all available data. The list of variables is shown in Table 4.1.

Table 2 List of Variables

Conventional Stock Indices	Symbol
Base Index	
MSCI Turkey Index	TUC
International Stock Indices	
MSCI Germany Index	GEC
MSCI United Kingdom Index	UKC
MSCI Italy Index	ITC
MSCI United States Index	USC
MSCI France Index	FRC
MSCI Spain Index	SPC
MSCI Netherland Index	NEC
MSCI Russia Index	RUC
Islamic Stock Indices	Code
Base Index	
MSCI Turkey Index	TUI
International Stock Indices	
MSCI Germany Index	GEI
MSCI United Kingdom Index	UKI
MSCI Italy Index	ITI
MSCI United States Index	USI
MSCI France Index	FRI
MSCI Spain Index	SPI
MSCI Netherland Index	NEI
MSCI Russia Index	RUI

CHAPTER V

DATA ANALYSIS & DISCUSSION

5.1 Descriptive Statistics

The descriptive statistics of the return series, which are claculated as rt = ln(pt/pt − 1), where pt and pt-1 denotes the price index at time t and t-1, are summarized in Table 3. Conventional and Islamic stock indices of Spain and Germany markets have inverse avarega returns . The returns are negative on average except US and Netherland markets . The maximum average return is provided by Russian conventional and Islamic stock indices. The highest volatility and therefore risk is displayed by Russian Islamic stock index; whereas the lowest one is US Islamic index. However, this is absolute time independent, measured by standard deviation. All assets have a Kurtosis value, which is the concentration of data around the mean value, is greater than 3 . This implies that indicating the return series are not normally distributed. It proves fat-tailed property of return series and withnessing extreme values is more likely (Nagayev & Masih, 2013). However, in terms of skewness, all asset returns are left-tailed from the symmetrical bell-curve, meaning tendency towards large negative returns (Nagayev & Masih, 2013).

Table 3 : Descriptive Statistics of Stock Indices

Sample period : 3409 observations from 01-Jan-08 to 22-Jan-21

Variables	Mean	Maximum	Minimum	Std. Deviation	Skewness	Kurtosis
TUC	-0,0003426	0,16158	-0,16858	0,022071	-0,32807	8,2805
TUI	-0,00008	0,17218	-0,17397	0,021496	-0,33296	8,5841
GEC	-0,00002081	0,11589	-0,15094	0,016229	-0,28632	11,1502
GEI	7,078E-08	0,16814	-0,14106	0,016456	-0,5217	13,5665
UKC	-0,000117	0,12161	-0,14205	0,014905	-0,39923	14,8790
UKI	-0,00009925	0,17542	-0,17601	0,016391	-0,24883	18,2774
ITC	-0,0002504	0,1247	-0,20544	0,018887	-0,59364	12,4207
ITI	-0,0002561	0,17152	-0,20317	0,019689	-0,28044	14,8133
USC	0,0002915	0,11043	-0,12922	0,013088	-0,59564	16,6806
USI	0,0002025	0,11736	-0,11827	0,012449	-0,41796	16,8421
FRC	-0,00002608	0,11844	-0,14903	0,016483	-0,26013	11,6811
FRI	-0,0000213	0,12591	-0,14194	0,016302	-0,15214	11,8919
SPC	-0,0002222	0,16005	-0,17217	0,018447	-0,30311	12,3714
SPI	0,00009153	0,13525	-0,15349	0,017439	-0,17062	10,9399
NEC	0,0001329	0,10527	-0,1209	0,015028	-0,31726	11,4055
NEI	0,0003222	0,099658	-0,11082	0,015028	-0,23706	8,4799
RUC	-0,0002405	0,23976	-0,25593	0,023245	-0,48025	19,5685
RUI	- 0.00027920000	0,22519	-0,2648	0,023844	-0,49239	17,6820

5.2 Empirical Results

The empirical results of this research are obtained by using two empirical tests. The first one is to compare the Maximized Log-Likelihood (ML) estimates of the Gaussian DCC model and the t-DCC model in order to show which model is relatively more signifant. We set $\mu_{t-1} = 0$ and thus apply the DCC models to the daily returns over the period under review since our primary interest is in volatility modeling and the estimation of correlations between the returns of stock indices. Any instances of non-convergence or serial correlation when running the experiments is not found. Secondly, we plot the estimated conditional volatilities and correlations .

5.2.1 Should the Turkey-based Conventional Equity Investors Invest in Germany, The United Kingdom, Italy, Iraq, United States, France, Spain, The Netherlands, Russia to Gain International Portfolio Diversification Benefits?

Initially, we examine if conventional stock indices from Germany, The United Kingdom, Italy, United States, France, Spain, Netherlands, Russia in order to investigate potential diversification opportunities for Turkey-based conventional equity investors.

5.2.1.1 Maximum Log-Likelihood Estimates of Gaussian DCC and t-DCC Models on Conventional Index Returns

First of all, Maximum Log-Likelihood estimates for DCC model with underlying Gaussian distribution and DCC model with underlying student t-distribution on the Turkish conventional index return series and conventional stock index return series of its trading partners, namely Germany, United Kingdom, Italy, Iraq, United States, France, Spain, The Netherlands, Russia shall be calculated to see which model is relatively more significant.

Table 4 indicates the Maximum Log-Likelihood estimates for DCC model with underlying Gaussian distribution on conventional index return series of Turkey and its trading partners and λ_{1i} and λ_{2i}. The estimated unconditional volatilities and correlations of conventional stock index returns of Turkey and its trading partners under the normal distribution model are revealed in Table 5. The volatility parameters observed under this model are highly significant, with the estimates of λ_{1i}, i = 1, 2, 3, 4, 5, 6, 7, 8, 9 are very close to one, implying a gradual volatility decay.

Table 4 Results of Multivariate GARCH with underlying Normal Distribution on the conventional index return series

Parameter	**Estimate**	**Standard Error**	**T-Ratio[Prob]**
lambda1_D_TUC	.87813	.015123	58.0644[.000]
lambda1_D_GEC	.92681	.0039039	237.4087[.000]
lambda1_D_UKC	.91453	.0064182	142.4909[.000]
lambda1_D_ITC	.90913	.0057099	159.2189[.000]
lambda1_D_USC	.82918	.012724	65.1675[.000]
lambda1_D_FRC	.91757	.0041586	220.6420[.000]
lambda1_D_SPC	.90209	.0060275	149.6629[.000]
lambda1_D_NEC	.92644	.0051491	179.9230[.000]
lambda1_D_RUC	.90896	.0080741	112.5777[.000]
lambda2_D_TUC	.090566	.010165	8.9099[.000]
lambda2_D_GEC	.062960	.0031204	20.1770[.000]
lambda2_D_UKC	.075432	.0053381	14.1310[.000]
lambda2_D_ITC	.073481	.0042269	17.3841[.000]
lambda2_D_USC	.15526	.011205	13.8567[.000]
lambda2_D_FRC	.071070	.0033317	21.3316[.000]
lambda2_D_SPC	.082679	.0047542	17.3908[.000]
lambda2_D_NEC	.064208	.0042178	15.2232[.000]
lambda2_D_RUC	.081553	.0069196	11.7857[.000]
delta1	.96860	.0020669	468.6206[.000]
delta2	.016010	.8304E-3	19.2791[.000]

Maximized Log-Likelihood = 104518.7

Table 5 : Estimated Unconditional Volatility Matrix with underlying Normal Distribution on the conventional index return series

Matrix	D_TUC	D_GEC	D_UKC	D_ITC	D_USC	D_FRC	D_SPC	D_NEC	D_RUC
D_TUC	.021985	.55433	.54675	.50580	.37091	.55183	.51561	.54828	.52071
D_GEC	.55433	.016123	.86597	.87875	.60338	.94921	.85707	.91243	.62342
D_UKC	.54675	.86597	.014834	.82346	.57966	.89851	.81810	.87069	.64546
D_ITC	.50580	.87875	.82346	.018862	.53806	.91598	.90967	.87222	.57845
D_USC	.37091	.60338	.57966	.53806	.013077	.58834	.53717	.58850	.43217
D_FRC	.55183	.94921	.89851	.91598	.58834	.016381	.90758	.94092	.63084
D_SPC	.51561	.85707	.81810	.90967	.53717	.90758	.018338	.85679	.55716
D_NEC	.54828	.91243	.87069	.87222	.58850	.94092	.85679	.014918	.61091
D_RUC	.52071	.62342	.64546	.57845	.43217	.63084	.55716	.61091	.023213

Secondly, the Maximum Log-Likelihood estimates for DCC model with underlying student-t distribution on conventional index return series of Turkey and its trading partners are acquired in Table 6. The estimated unconditional volatilities and correlations of conventional stock index returns of Turkey and its trading partners under the t-DCC model are revealed in Table 7.

Table 6 : Results of Multivariate GARCH with underlying t-Distribution on the conventional index return series

Parameter	Estimate	Standard Error	T-Ratio[Prob]
lambda1_D_TUC	.90039	.014661	61.4121[.000]
lambda1_D_GEC	.93718	.0041501	225.8198[.000]
lambda1_D_UKC	.93266	.0058936	158.2499[.000]
lambda1_D_ITC	.92309	.0061572	149.9211[.000]
lambda1_D_USC	.86614	.011902	72.7722[.000]
lambda1_D_FRC	.93009	.0045875	202.7467[.000]
lambda1_D_SPC	.92212	.0061534	149.8554[.000]
lambda1_D_NEC	.93698	.0054394	172.2561[.000]
lambda1_D_RUC	.92866	.0071895	129.1685[.000]
lambda2_D_TUC	.074042	.0098261	7.5352[.000]
lambda2_D_GEC	.053534	.0033136	16.1558[.000]
lambda2_D_UKC	.058724	.0048799	12.0339[.000]
lambda2_D_ITC	.061452	.0045681	13.4524[.000]
lambda2_D_USC	.12209	.010480	11.6500[.000]
lambda2_D_FRC	.059716	.0036715	16.2647[.000]
lambda2_D_SPC	.065370	.0048709	13.4205[.000]
lambda2_D_NEC	.054637	.0044446	12.2928[.000]
lambda2_D_RUC	.064898	.0062906	10.3167[.000]

delta1	.96989	.0020817	465.9224[.000]
delta2	.015217	.8216E-3	18.5219[.000]
df	7.5096	.28412	26.4307[.000]

Maximized Log-Likelihood = 105502.4

df is the degrees of freedom of the multivariate t distribution

Table 7 : Estimated Unconditional Volatility Matrix

Matrix	D_TUC	D_GEC	D_UKC	D_ITC	D_USC	D_FRC	D_SPC	D_NEC	D_RUC
D_TUC	.021985	.55433	.54675	.50580	.37091	.55183	.51561	.54828	.52071
D_GEC	.55433	.016123	.86597	.87875	.60338	.94921	.85707	.91243	.62342
D_UKC	.54675	.86597	.014834	.82346	.57966	.89851	.81810	.87069	.64546
D_ITC	.50580	.87875	.82346	.018862	.53806	.91598	.90967	.87222	.57845
D_USC	.37091	.60338	.57966	.53806	.013077	.58834	.53717	.58850	.43217
D_FRC	.55183	.94921	.89851	.91598	.58834	.016381	.90758	.94092	.63084
D_SPC	.51561	.85707	.81810	.90967	.53717	.90758	.018338	.85679	.55716
D_NEC	.54828	.91243	.87069	.87222	.58850	.94092	.85679	.014918	.61091
D_RUC	.52071	.62342	.64546	.57845	.43217	.63084	.55716	.61091	.023213

It is found that the maximum log-likelihood value obtained by the t-DCC model (105502.4) is higher than that obtained by the Gaussian model (104518.7). Additionally, the estimated degrees of freedom for the t-normal distribution is 7.5096, which is below 30. Therefore, this result implies that the fat-tailed nature of conventional index returns of Turkey and its trading partners tends to be best captured by the t-distribution model.

Since the t-DCC model has been selected as the most suitable model for conventional stock indices, Tables 4 and Table 5 are used in the following discussion. The volatility parameters observed under t-DCC model are highly significant, with the estimates of λ_{1i}, i = 1, 2, 3, 4, 5, 6, 7, 8, 9 are very close to one, implying a gradual volatility decay, as can be seen in Table 4. This implies that after a market shock, the riskiness associated with the returns will gradually cancel out. Furthermore, we note that the number of lambda1 and lambda 2 for all stock indices (for example, lambda1_GE + lambda2_GE = 0.991334) is less than 1 or unity. This means that the shock to the returns volatilities is temporary, in other words not the Integrated Generalized Auto Regressive Conditional Heteroskedasticity (IGARCH). This phenomenon has a significant implication: it implies that investors and portfolio managers have a higher risk of losing their money, even though they will make a profit in the short term. Speculators and short-term investors, on the other hand, will profit from such market conditions.

The unconditional volatilities of conventional index returns are represented by the on-diagonals in Table 5. The index is said to be less volatile if the unconditional volatility is close to zero. On the other hand, unconditional volatility close to one means that the index is more volatile. In Table 8, the unconditional volatilities of conventional indices are listed in an increasing order.

Table 8 : Unconditional Volatilities of Conventional Index Return Series

No	Conventional Index	Unconditional Volatility
1	US	0.013077
2	UK	0.014834
3	Netherland	0.014918
4	Germany	0.016123
5	France	0.016381
6	Spain	0.018338
7	Italy	0.018862
8	Turkey	0.021985
9	Russia	0.023213

Conventional stock indices have low unconditional volatilities, ranging from 0.013077 to 0.023213. It is also observed that conventional stock indices have nearly same degree of volatility. It is noteworthy to say that Turkish conventional stock indices are the second most volatile one after Russia.

In Table 5, the off-diagonal elements represent the unconditional correlation between Turkish conventional index returns and conventional index returns of its trading partners. Accordingly, Table 9 shows the unconditional correlations in an increasing order. It is found that the unconditional correlations of Turkey with its trading partners, except US, are at more or less the same level, ranging from +0.505 to +0.554. The relatively higher correlation between index returns between Turkish and European trading partners' markets may be explained by market spillover effects resulting from high trade level and numerous trade agreements between Turkey and the European Union, such as the European Union–Turkey Customs Union. Especially, Germany has been the top trading partner and covers almost 10 per cent of the Turkey's total trade in 2020. In the same way, Russia as being one of the main trading partners, with 8 per cent share in total import volume of Turkey in 2020, shows high correlation with Turkey. The lowest unconditional correlation exists between US conventional equity market and Turkish conventional equity market, at +0.370. This suggests that Turkish conventional equity investors would benefit from greater diversification if they invested in the US market instead of other trading partners.

Table 9 : Unconditional Correlations between Conventional Index Returns of Turkey and Trading Partners

Conventional Index	Unconditional Correlation
US	0.37091
Italy	0.50580
Spain	0.51561
Russia	0.52071
UK	0.54675
Netherland	0.54828
France	0.55183
Germany	0.55433

5.2.1.2 Conditional Volatilities of Coventional Index Returns

The dynamic conditional volatilities for each conventional stock index return are shown in Figure 3. According to our findings, the conditional volatilities of the conventional stock indices follow nearly same path. This finding is parallel with the findings of Çemrek & Polat (2021) that volatility tranfer is mainly due to high trade volume between the markets. The lowest conditional volatility is witnessed on The MSCI US stock index returns; whereas the highest volatilities are recorded by the MSCI Russia and Turkey. Both findings are in compliance with the prior findings on unconditional volatilities in Table 8. Within the time interval of the study, the conditional volatilities increased to the highest level during the global financial crisis of 2008. The second highest peak and covergence of volatility is reached in March, 2020 due to Covid-19 pandemy, whose negative effects are still prevailing. Nearly three and a half million people have lost their life. The entire world has encountered and still struggling with severe social and economic problems related to the pandemy. In both cases, there was also a substantial convergence of volatility among all stock index returns during the crisis periods which may be disadvantageous to investors and portfolio managers because it limits portfolio diversification options due to such great level of financial integration of the markets. At the end of 2011, there was an apparent increase in the volatility of conventional stock indices, which can be related to the European sovereign debt crisis. It was especially due to the balance of payment crisis of Greece, Portugal, Ireland, Spain, and Cyprus and then crisis spread to the entire European Union. By the way, the Russian equity market recorded a high returns volatility at the end of 2014. This might be attributed to the political tension due to the Ukraine crisis, which fluctuated country's economy as a result of the sanctions imposed by the European states and devaluation (nearly fifty percent) in ruble. Additionally, the Italian equity market affected by a significant returns volatility around 2016. It seems to be due to political unrest after Prime Minister Matteo Renzi's resignation following a 'no' result in Italy's historic constitutional referendum. On the other hand, The Turkish equity market spotted a substantial volatility increase in 2013 due to Gezi protests and in 2018 due to currency crisis.

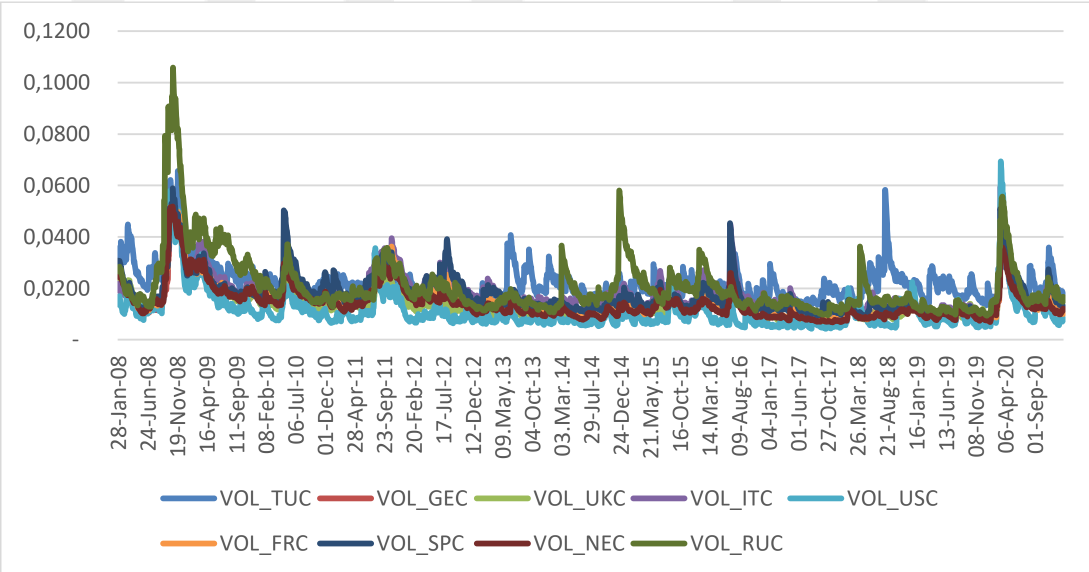


Figure 3 Conditional Volatilities of Conventioanal Indices

5.2.1.3 Conditional Correlations of Conventional Index Retuns

Lastly, we plot the conditional correlations of Turkey's trading partners conventional stock index returns with Turkey conventional index returns in Figure 4. The plot indicates that the return correlations of the Turkish conventional stock index with its trading partners, except US, seems to move quite closely together, especially during turmoil times including the 2008 global financial crisis and Covid-19 outbreak. Moreover, the plot confirms the previous results of the unconditional correlations in Table 9, showing that the Turkish Islamic stock index has more or less same level of correlation with the Germany, France, Netherland, UK, Russia, Spain, Italy conventional market returns and is less correlated to the US conventional stock index returns. From here, it can be suggested that if the Turkey-based conventional equity investors were to invest their assets internationally, they should include the US conventional stock index in their portfolio in order to gain more diversification benefits as compared to other trading partners conventional stock indices.

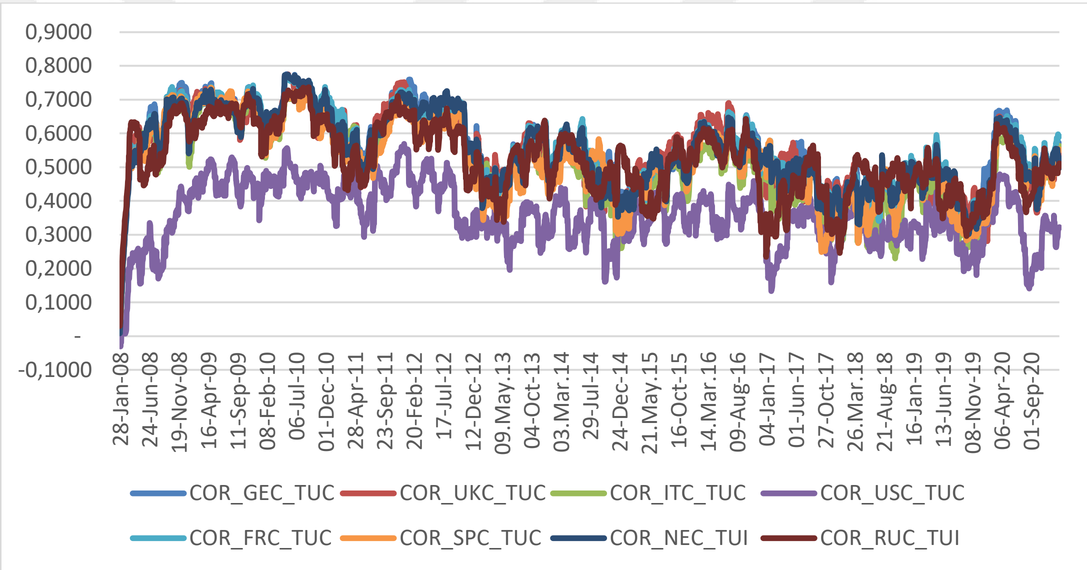


Figure 4 Conditional Correlations between Conventional Indices of Turkey and Trading Partners

5.2.2 Should the Turkey-based Islamic equity investors invest in Germany, United Kingdom, Italy, United States, France, Spain, Netherlands, Russia to gain international portfolio diversification benefits?

In the second part of the study, we explore how useful Islamic stock indices of Germany, United Kingdom, Italy, United States, France, Spain, Netherlands, Russia in providing portfolio diversification opportunities from the perspective of the Turkey based Islamic equity investors.

5.2.2.1 Maximum Log-Likelihood Estimates of Gaussian DCC and t-DCC Models on Islamic Index Returns

We use the same steps as in the previous section to calculate Maximum Log-Likelihood estimates for DCC model with underlying Gaussian distribution and DCC model with underlying student t-distribution on the Turkish Islamic index return series and Islamic stock index return series of its trading partners, namely Germany, The United Kingdom, Italy, Iraq, United States, France, Spain, The Netherlands, in order to decide which model is relatively more significant.

Table 10 indicates the Maximum Log-Likelihood estimates for DCC model with underlying Gaussian distribution on Islamic index return series of Turkey and its trading partners and λ_{1i} and λ_{2i}. The estimated unconditional volatilities and correlations of Islamic stock index returns of Turkey and its trading partners under the normal distribution model are revealed in Table 11. The volatility parameters observed under this model are highly significant, with the estimates of λ_{1i}, i = 1, 2, 3, 4, 5, 6, 7, 8, 9 are very close to one, implying a gradual volatility decay.

Table 10 : Results of Multivariate GARCH with underlying Normal Distribution on Islamic index return series

Parameter	Estimate	Standard Error	T-Ratio[Prob]
lambda1_D_TUI	.90078	.016410	54.8911[.000]
lambda1_D_GEI	.94145	.0038491	244.5873[.000]
lambda1_D_UKI	.93598	.0047819	195.7335[.000]
lambda1_D_ITI	.93474	.0052882	176.7595[.000]
lambda1_D_USI	.83647	.013292	62.9314[.000]
lambda1_D_FRI	.94097	.0039141	240.4064[.000]
lambda1_D_SPI	.92327	.0069054	133.7023[.000]
lambda1_D_NEI	.94361	.0050543	186.6950[.000]
lambda1_D_RUI	.91699	.0074785	122.6175[.000]
lambda2_D_TUI	.074209	.010895	6.8110[.000]
lambda2_D_GEI	.048420	.0029497	16.4155[.000]
lambda2_D_UKI	.054450	.0038072	14.3016[.000]
lambda2_D_ITI	.050704	.0037611	13.4813[.000]
lambda2_D_USCI	.14728	.011482	12.8270[.000]
lambda2_D_FRI	.048971	.0030295	16.1646[.000]
lambda2_D_SPI	.062518	.0052692	11.8647[.000]
lambda2_D_NEI	.045945	.0038064	12.0706[.000]
lambda2_D_RUI	.074351	.0063903	11.6350[.000]

delta1	.97571	.0014195	687.3758[.000]
delta2	.011610	.6072E-3	19.1198[.000]

Maximized Log-Likelihood = 99985.0

Table 11 : Estimated Unconditional Volatility Matrix

	D_TUI	D_GEI	D_UKI	D_ITI	D_USI	D_FRI	D_SPI	D_NEI	D_RUI
D_TUI	.021400	.46559	.44352	.43297	.30226	.47748	.42678	.44743	.45907
D_GEI	.46559	.016351	.83155	.84820	.57191	.93635	.82297	.86038	.57797
D_UKI	.44352	.83155	.016331	.84923	.58930	.87027	.75598	.77330	.62444
D_ITI	.43297	.84820	.84923	.019661	.54393	.88640	.77403	.76026	.59859
D_USI	.30226	.57191	.58930	.54393	.012438	.59292	.52075	.55661	.41638
D_FRI	.47748	.93635	.87027	.88640	.59292	.016185	.84175	.87129	.60409
D_SPI	.42678	.82297	.75598	.77403	.52075	.84175	.017292	.76052	.50722
D_NEI	.44743	.86038	.77330	.76026	.55661	.87129	.76052	.014949	.53519
D_RUI	.45907	.57797	.62444	.59859	.41638	.60409	.50722	.53519	.023801

Then, the Maximum Log-Likelihood estimates for DCC model with underlying student-t distribution on Islamic index return series of Turkey and its trading partners are acquired in Table 12 . The estimated unconditional volatilities and correlations of Islamic stock index returns of Turkey and its trading partners under the t-DCC model are revealed in Table 13.

Table 12 : Results of Multivariate GARCH with underlying t-Distribution on the Islamic index return series

Parameter	Estimate	Standard Error	T-Ratio[Prob]
lambda1_D_TUI	.89210	.017854	49.9671[.000]
lambda1_D_GEI	.94585	.0043285	218.5196[.000]
lambda1_D_UKI	.94237	.0052895	178.1592[.000]
lambda1_D_ITI	.94240	.0059586	158.1582[.000]
lambda1_D_USI	.86958	.011963	72.6917[.000]
lambda1_D_FRI	.94638	.0046181	204.9263[.000]
lambda1_D_SPI	.93199	.0080621	115.6024[.000]
lambda1_D_NEI	.94649	.0056335	168.0132[.000]
lambda1_D_RUI	.92999	.0072257	128.7059[.000]
lambda2_D_TUI	.078449	.011550	6.7924[.000]
lambda2_D_GEI	.045118	.0033633	13.4145[.000]
lambda2_D_UKI	.048356	.0041878	11.5468[.000]
lambda2_D_ITI	.046304	.0044506	10.4039[.000]
lambda2_D_USCI	.11729	.010319	11.3659[.000]
lambda2_D_FRI	.044494	.0035762	12.4416[.000]
lambda2_D_SPI	.055593	.0062011	8.9651[.000]
lambda2_D_NEI	.044307	.0043388	10.2119[.000]
lambda2_D_RUI	.063033	.0062370	10.1062[.000]
delta1	.97714	.0015975	611.6789[.000]
delta2	.010989	.6336E-3	17.3429[.000]
df	7.5242	.27980	26.8918[.000]

Maximized Log-Likelihood = 101120.0

df is the degrees of freedom of the multivariate t distribution

Table 13: Estimated Unconditional Volatility Matrix

Matrix	D_TUI	D_GEI	D_UKI	D_ITI	D_USI	D_FRI	D_SPI	D_NEI	D_RUI
D_TUI	.021400	.46559	.44352	.43297	.30226	.47748	.42678	.44743	.45907
D_GEI	.46559	.016351	.83155	.84820	.57191	.93635	.82297	.86038	.57797
D_UKI	.44352	.83155	.016331	.84923	.58930	.87027	.75598	.77330	.62444
D_ITCI	.43297	.84820	.84923	.019661	.54393	.88640	.77403	.76026	.59859
D_USI	.30226	.57191	.58930	.54393	.012438	.59292	.52075	.55661	.41638
D_FRI	.47748	.93635	.87027	.88640	.59292	.016185	.84175	.87129	.60409
D_SPI	.42678	.82297	.75598	.77403	.52075	.84175	.017292	.76052	.50722
D_NEI	.44743	.86038	.77330	.76026	.55661	.87129	.76052	.014949	.53519
D_RUI	.45907	.57797	.62444	.59859	.41638	.60409	.50722	.53519	.023801

We discovered that the maximum log-likelihood value obtained by the t-DCC model (101120.0) is higher than that obtained by the Gaussian model (104518.7).Besides, the estimated degrees of freedom for the t-normal distribution is 7.5242, which is below 30. Therefore, this result implies that the fat-tailed nature of lslamic index returns of Turkey and its trading partners tends to be best captured by the t-distribution model.

Since it is determined that the t-DCC model is the most suitable model for the Islamic stock indices, the following discussion is based on Table 12 and Table 13. The volatility parameters observed under t-DCC model are highly significant, with the estimates of λ_{1i}, i = 1, 2, 3, 4, 5, 6, 7, 8, 9 are very close to one, implying a gradual volatility decay, as can be seen in Table 12. This indicates that after a market shock, the riskiness associated with the returns may gradually cancel out. In addition, the sum of lambda1 and lambda2 for all Islamic stock indices (e.g. lambda_1GEI+lambda_2GEI=0.98703) is equal to or less than 1. This suggests that after a market shock, the riskiness associated with the returns will gradually cancel out. In other words, the shock to the returns volatilities is temporary, not the Integrated Generalized Auto Regressive Conditional Heteroskedasticity (IGARCH). Investors and portfolio managers have a higher risk of losing their money, even though they will make a profit in the short term. Speculators and short-term investors, on the other hand, will profit from such market conditions.

The unconditional volatilities of the Islamic index returns are represented by the on-diagonals in Table 13. The index is said to be less volatile if the unconditional volatility is close to zero. On the other hand, unconditional volatility close to one means that the index is more volatile. In Table 14, the unconditional volatilities of Islamic indices are listed in an increasing order.

Table 14 : Unconditional Volatilities of Islamic Indices

Islamic Index	Unconditional Volatility
US	0.012438
Netherland	0.014949
France	0.016185
UK	0.016331
Germany	0.016351
Spain	0.017292
Italy	0.019661
Turkey	0.0214
Russia	0.023801

Islamic stock indices have low unconditional volatilities, varying between 0.012438 to 0.023801. However, they are nearly at the same level of volatility with that the returns of conventional stock indices in general. This contradicts with the claim that Islamic stock indices are more stable than conventional ones due to being more conservative in leverage levels. It is not surprising that the MSCI US Islamic index returns, like the conventional one, is the least volatile market in the group. It is noteworthy to say that Turkish Islamic stock indices are the second most volatile one after Russia, like the conventional ones.

In Table 13, on the other hand, , the off-diagonal elements represent the unconditional correlations between Turkish Islamic index returns and Islamic index returns of its trading partners, which are listed in Table 15 in an increasing order. It is observed that the MSCI France Islamic index has the highest unconditional correlation with the MSCI Turkey Islamic index, being estimated at +0.47748. Whereas, the MSCI US Islamic index has the lowest unconditional correlation with the MSCI Turkey Islamic index. As a result, this finding indicates that Turkish Islamic equity investors would benefit from greater diversification if they invested in the US market instead of other trading partners.

Table 15 : Unconditional Correlations between Islamic Indices of Turkey and Trading Partners

Islamic Index	Unconditional Correlation
US	0.30226
Spain	0.42678
Italy	0.43297
UK	0.44352
Netherland	0.44743
Russia	0.45907
Germany	0.46559
France	0.47748

5.2.2.2 Conditional Volatilities of the Islamic Stock Indices

The dynamic conditional volatilities for each conventional stock index return are shown in Figure 5. According to our findings, the conditional volatilities of the conventional stock indices follow nearly same path. The lowest conditional volatility is witnessed on The MSCI US stock index returns; whereas the highest volatilities are recorded by the MSCI Russia and Turkey. Both findings are in compliance with the prior findings on unconditional volatilities in Table 14. Within the time interval of the study, the conditional volatilities increased to the highest level during the global financial crisis of 2008. Not surprisingly, covid-19 pandemy caused the second highest peak of volatility in March, 2020.In both cases, there was also a substantial convergence of volatility among all stock index returns during the crisis periods, which may be disadvantageous to investors and portfolio managers because it limits portfolio diversification options due to such great level of financial integration of the markets. At the end of 2011, there was also an apparent increase in the volatility of conventional stock indices, which can be related to the European sovereign debt crisis. It was especially due to the balance of payment crisis of Greece, Portugal, Ireland, Spain, and Cyprus and then crisis spread to the entire European Union. By the way, the Russian equity market recorded a high returns volatility in the end of 2014. This might be attributed to the political tension due to the Ukraine crisis, which fluctuated country's economy as a result of the sanctions imposed by the European states and devaluation (nearly fifty per cent) in ruble. The European equity markets witnessed high volatility and by the end of 2016 as a response to the events within the same year including Brexit uncertainty, The European Central Bank moneary policy decisions to battle deflation in Euozone, the US presidential election, Prime Minister Matteo Renzi's resignation following a 'no' result in Italy's historic constitutional referendum (Li, 2020). On the other hand, The Turkish equity market spotted a substantial volatility increase in 2013 due to Gezi protests and in 2018 due to currency crisis.

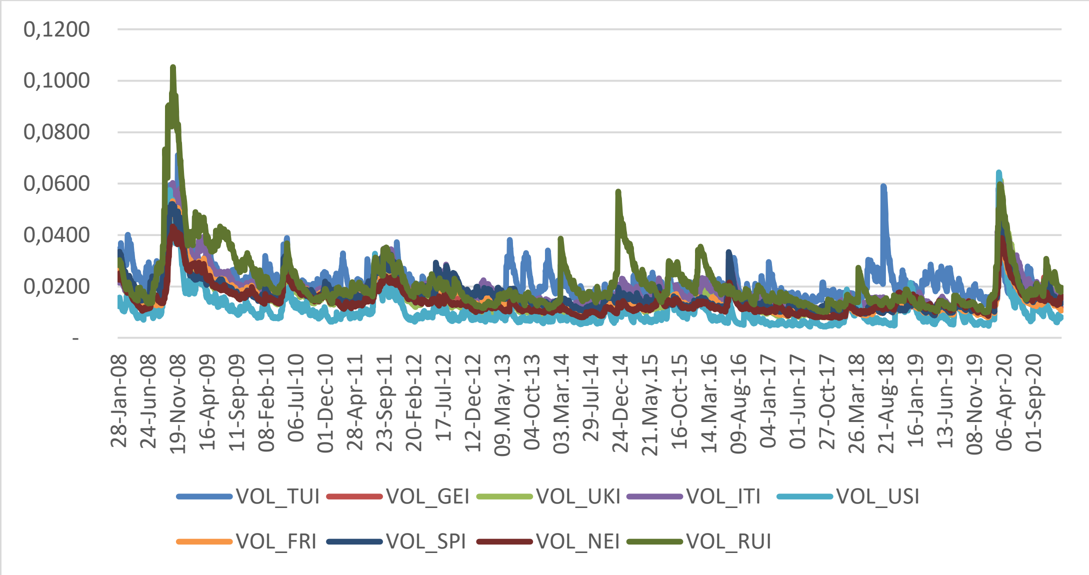


Figure 5 Conditional Volatilities of Islamic Indices

When we look at time-varying volatilities pairwise for both conventional and Islamic indices in Figure 6,7,8,9,10,11,12,13, it is witnessed that Islamic stock indices follow a similar volatility path with its conventional counterparts. It contradicts with the claim that Shariah screening (the prohibition of usury, excessive uncertainty and gambling) makes Islamic equities offer less risky, it is witnessed that Islamic stock indices follow a similar volatility path with its conventional counterparts.

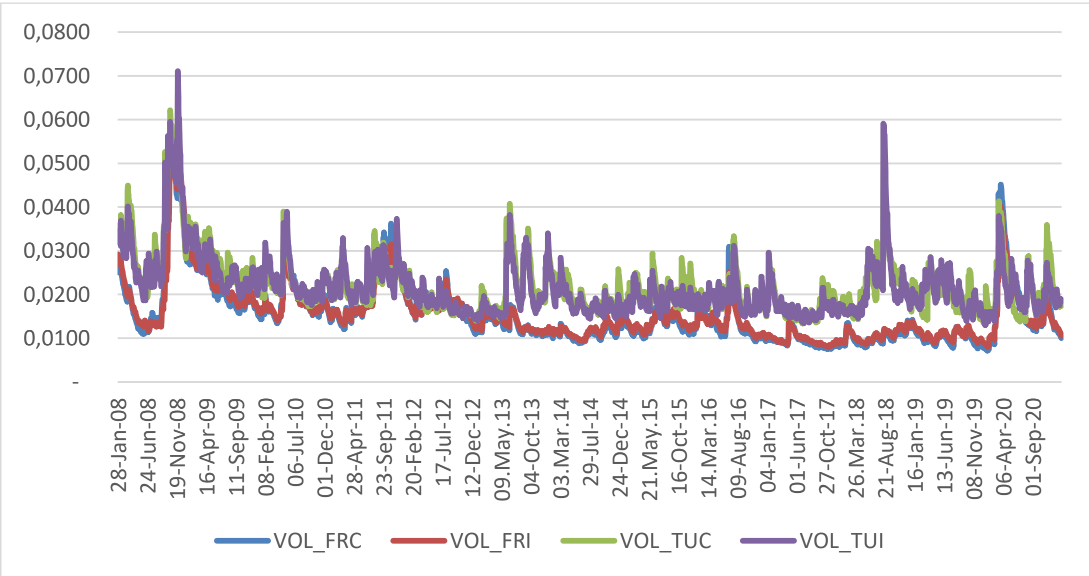


Figure 6 : Conditional Volatilities of Coventional and Islamic Indices of Turkey and France

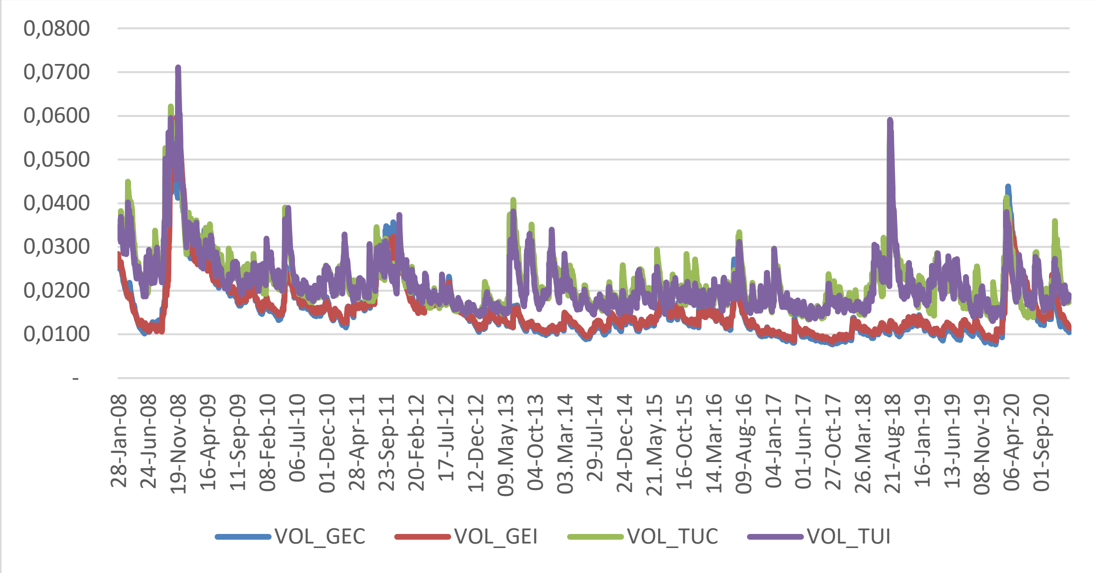


Figure 7 : Conditional Volatilities of Coventional and Islamic Indices of Turkey and Germany

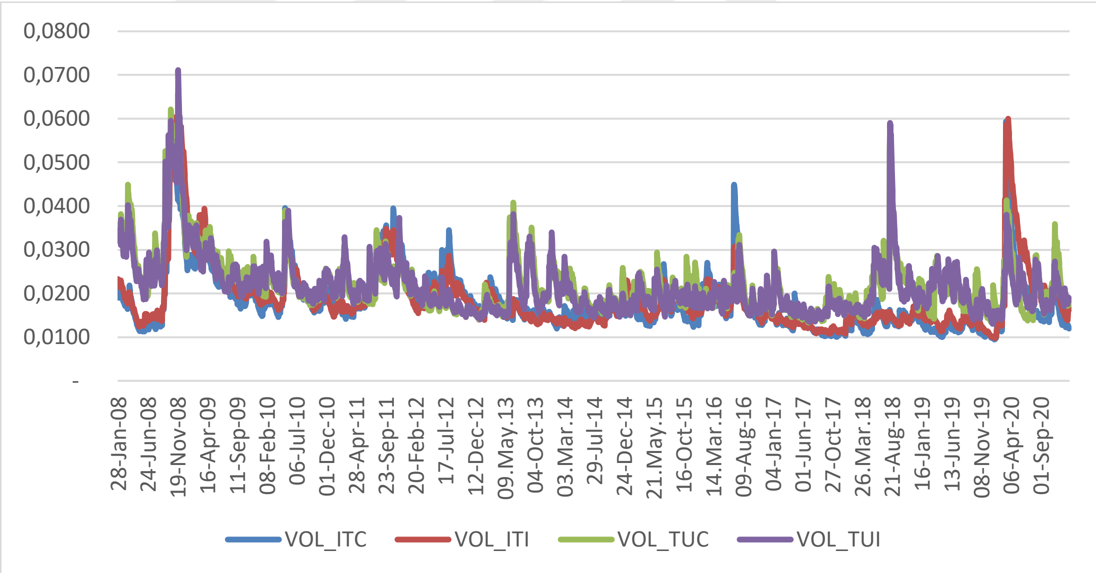


Figure 8 : Conditional Volatilities of Coventional and Islamic Indices of Turkey and Italy

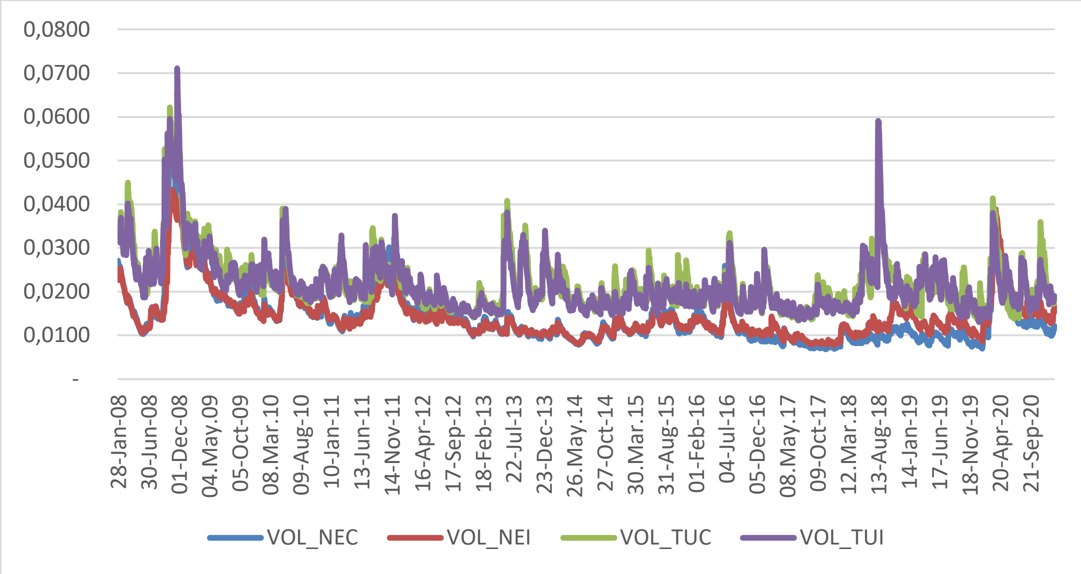


Figure 9 : Conditional Volatilities of Conventional and Islamic Indices of Turkey and Netherland

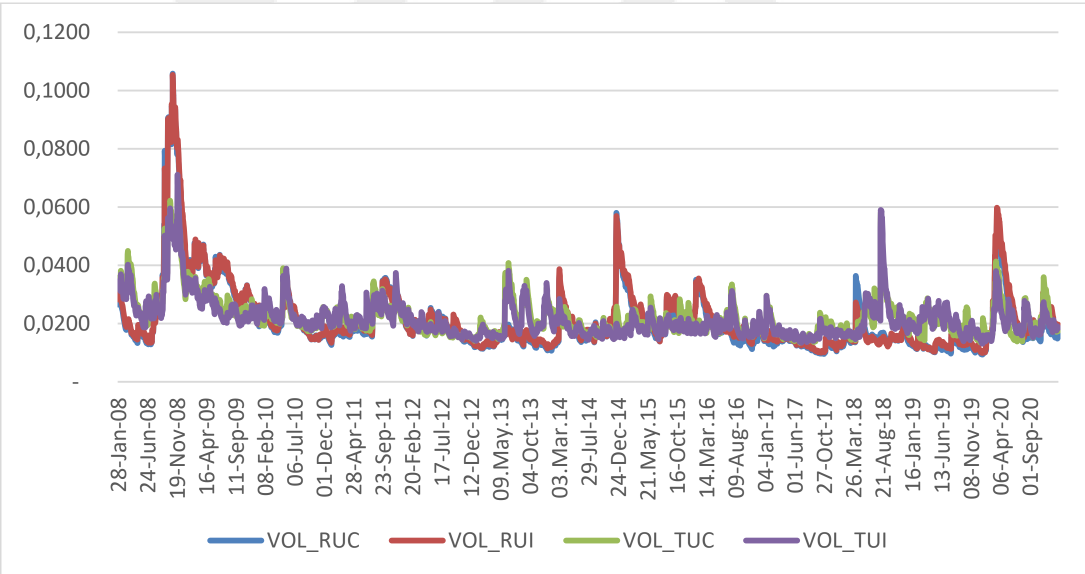


Figure 10 :Conditional Volatilities of Conventional and Islamic Indices of Turkey and Russia

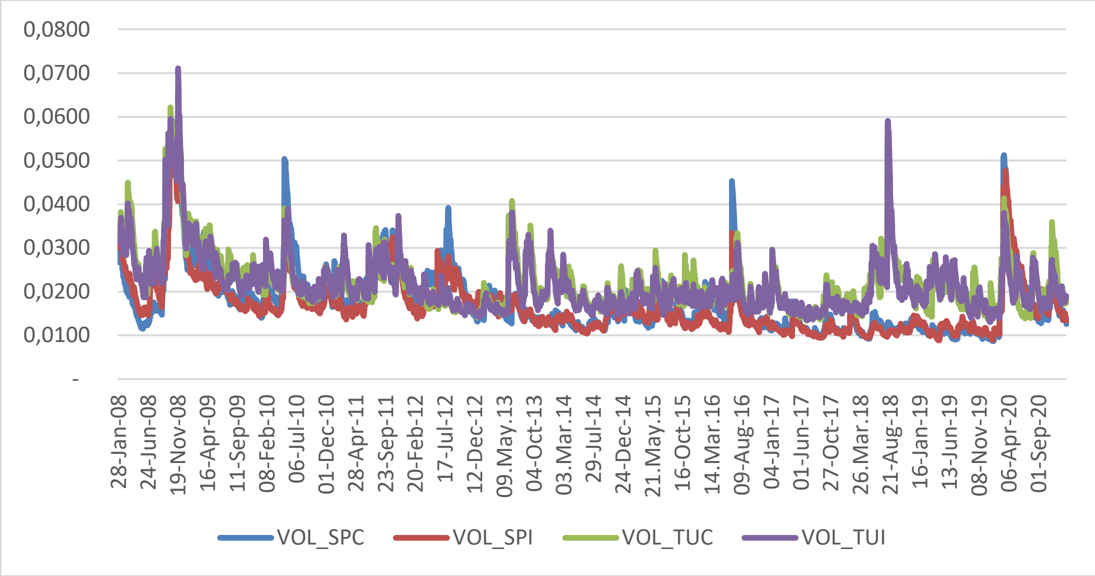


Figure 11 :Conditional Volatilities of Coventional and Islamic Indices of Turkey and Spain

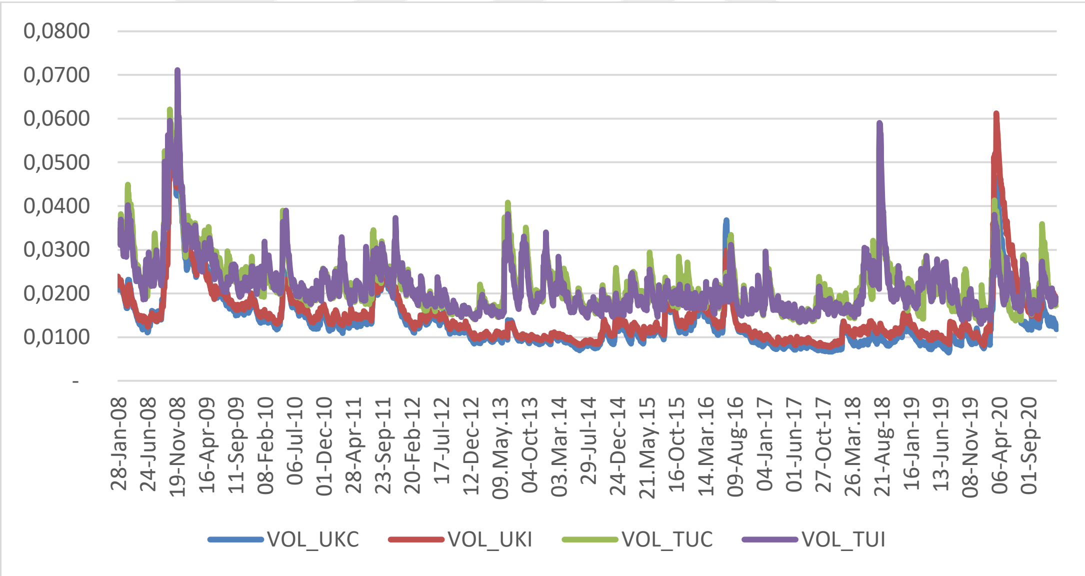
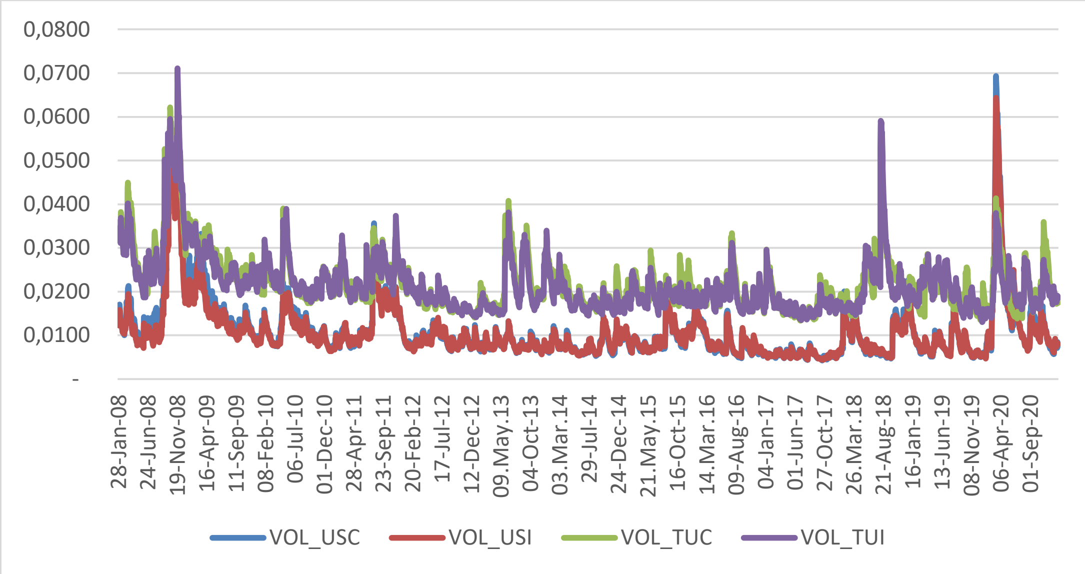


Figure 12 : Conditional Volatilities of Coventional and Islamic Indices of Turkey and UK



Figıre 13 : Conditional Volatilities of Coventional and Islamic Indices of Turkey and US

5.2.2.3 Conditional Correlations of Islamic Indices

The conditional correlations of Turkey's trading partners' Islamic stock index returns with the MSCI Turkey Islamic index returns are shown in Figure 14. The plot indicates that the return correlations of the Turkish Islamic stock index with its trading partners, except US, seems to move quite closely together, especially during turmoil times including the 2008 global financial crisis and Covid-19 outbreak. Moreover, the graph confirms the previous results of the unconditional correlations in Table 15, showing that the Turkish Islamic stock index has more or less same level of correlation with the Germany, France, Netherland, UK, Russia, Spain, Italy Islamic market returns and is less correlated to the US Islamic stock index returns. From here, it can be suggested that if the Turkey-based Islamic equity investors were to invest their assets internationally, they should include the US Islamic stock index in their portfolio in order to gain more diversification benefits as compared to other trading partners Islamic stock indices.

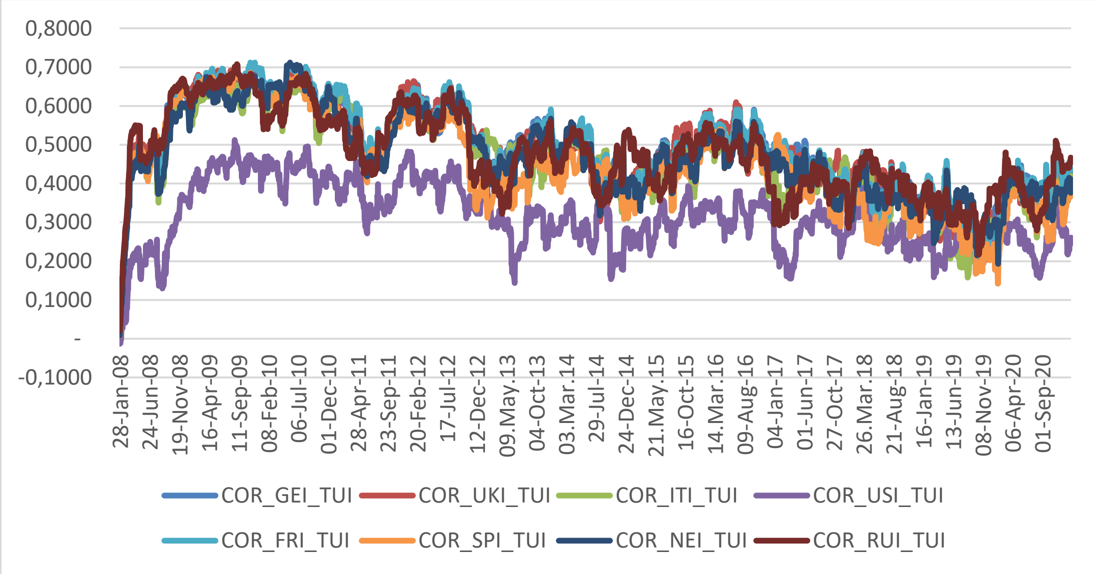


Figure 14 : Conditional Correlations of Islamic Indices of Turkey and Trading Partners

When we look at time-varying correlations pairwise for both conventional and Islamic indices in Figure 15,16,17,18,19,20,21,22, it is observed that Islamic indices indicates lower correlations. It may support real sector roots of Islamic equity since country-specific factors like differing fiscal and monetary policy cycles, and also currency fluctuation historically made return-generating mechanisms unique for each county (Gregg, 2012) (Bahlous & Mohd. Yusof, 2014).

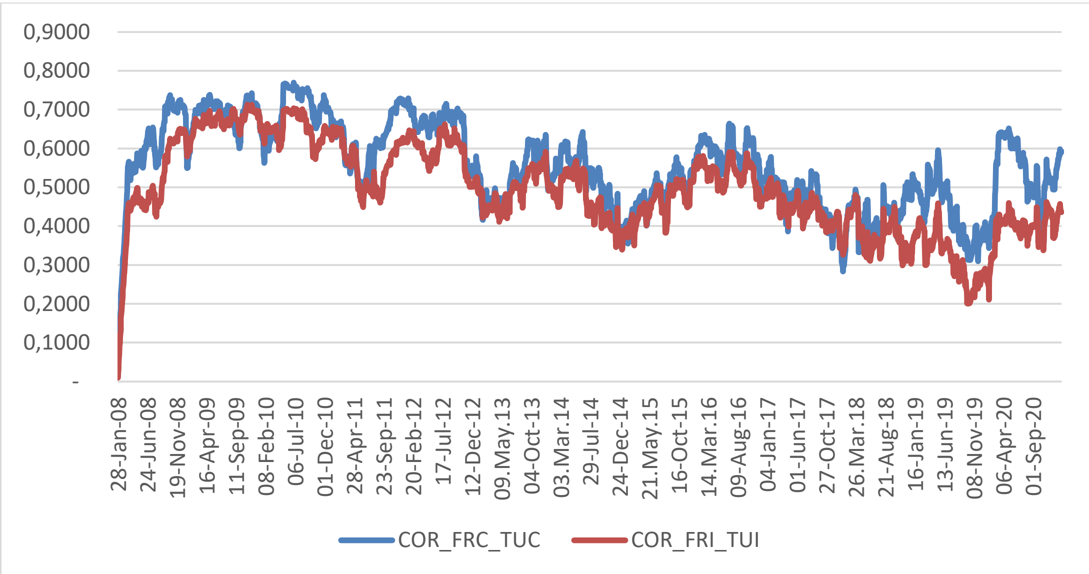


Figure 15 : Conditional Correlations of Coventional and Islamic Indices of Turkey and France

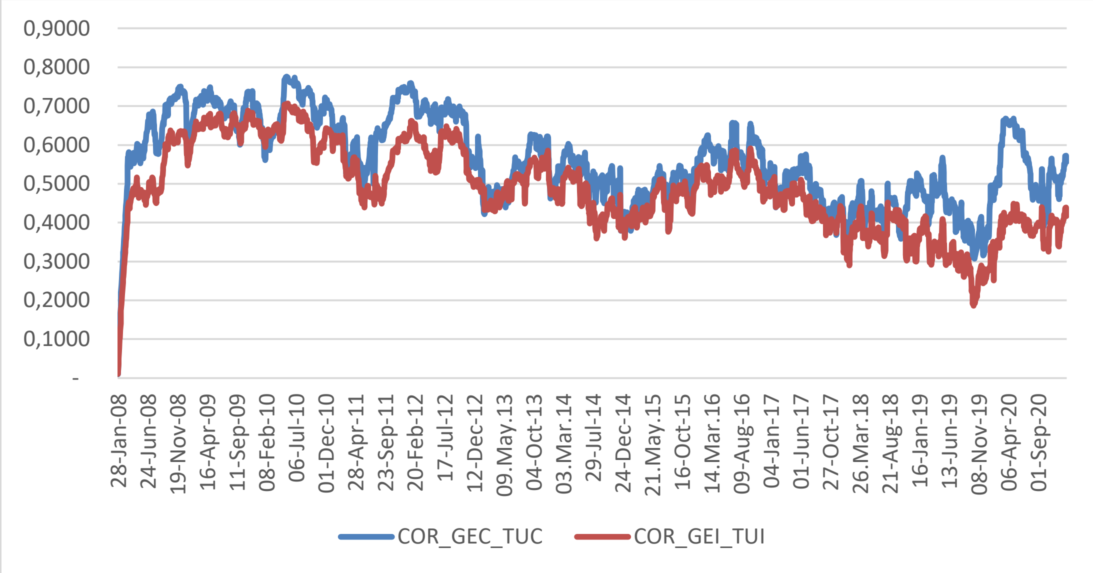


Figure 16 : Conditional Correlations of Coventional and Islamic Indices of Turkey and Germany

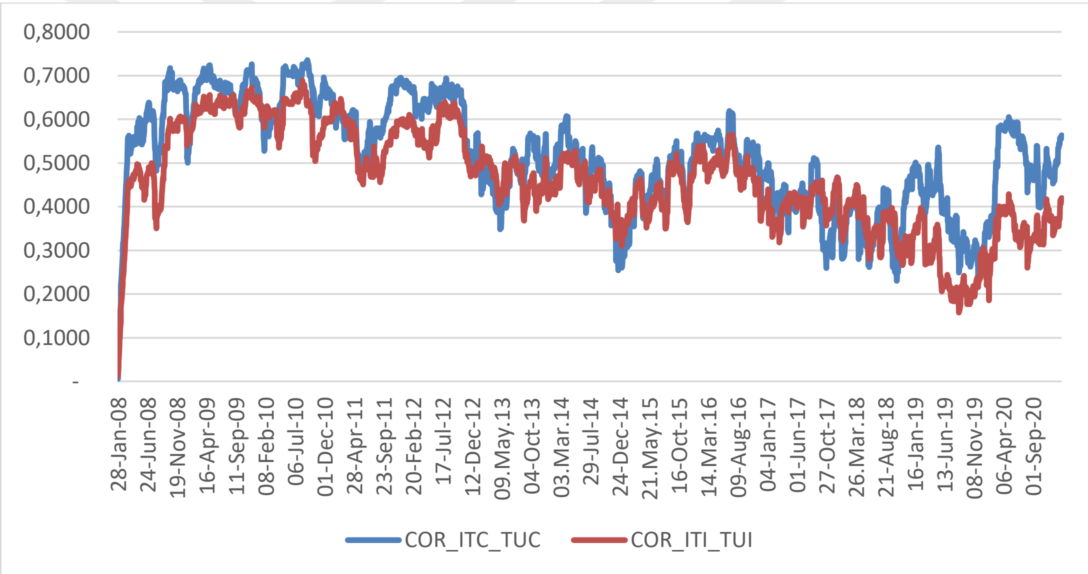


Figure 17 : Conditional Correlations of Coventional and Islamic Indices of Turkey and Italy

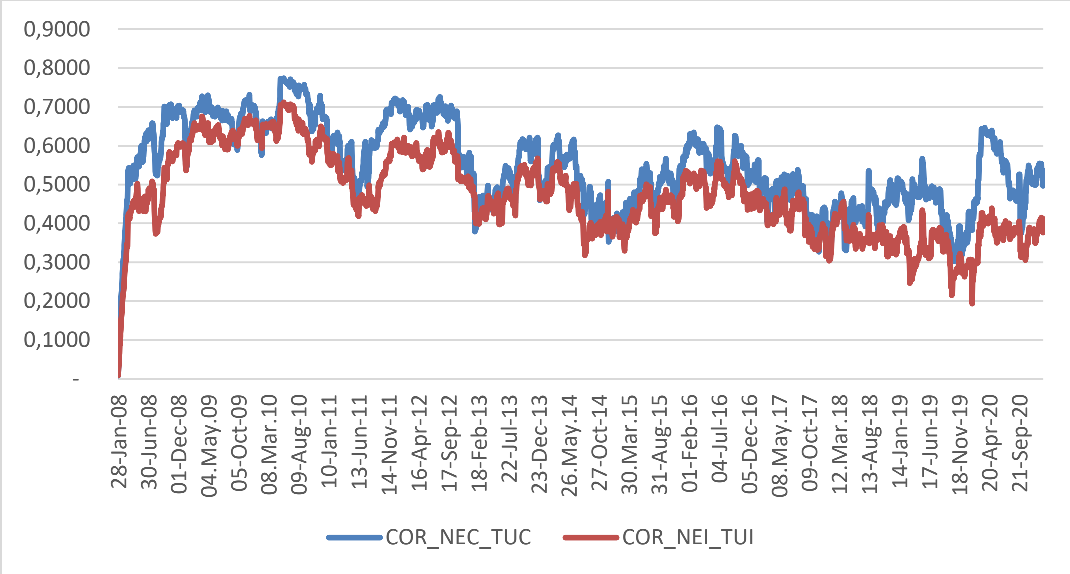


Figure 18 : Conditional Correlations of Coventional and Islamic Indices of Turkey and Netherland

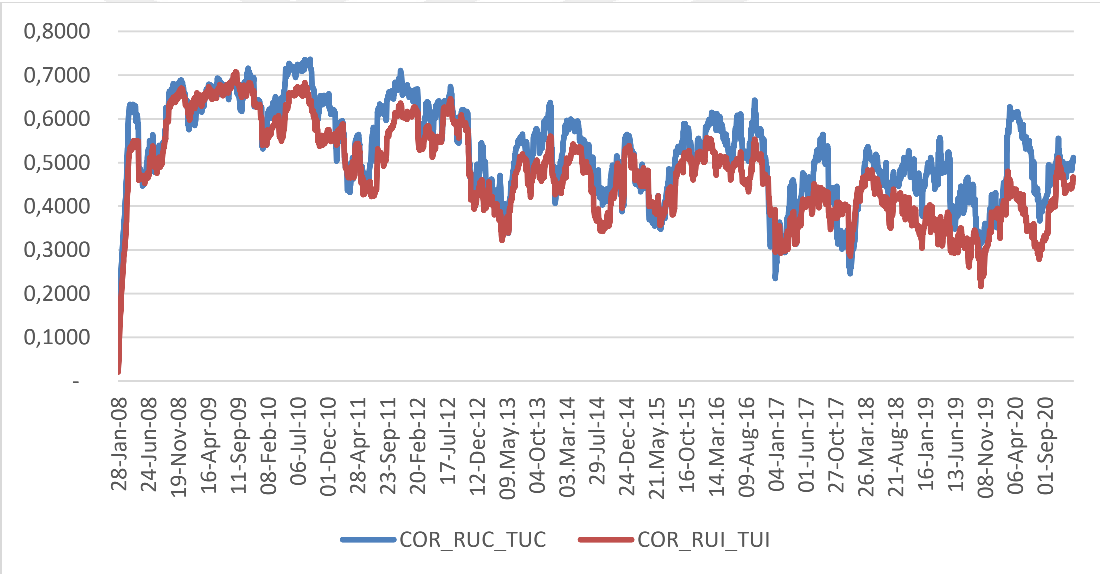


Figure 19 : Conditional Correlations of Coventional and Islamic Indices of Turkey and Russia

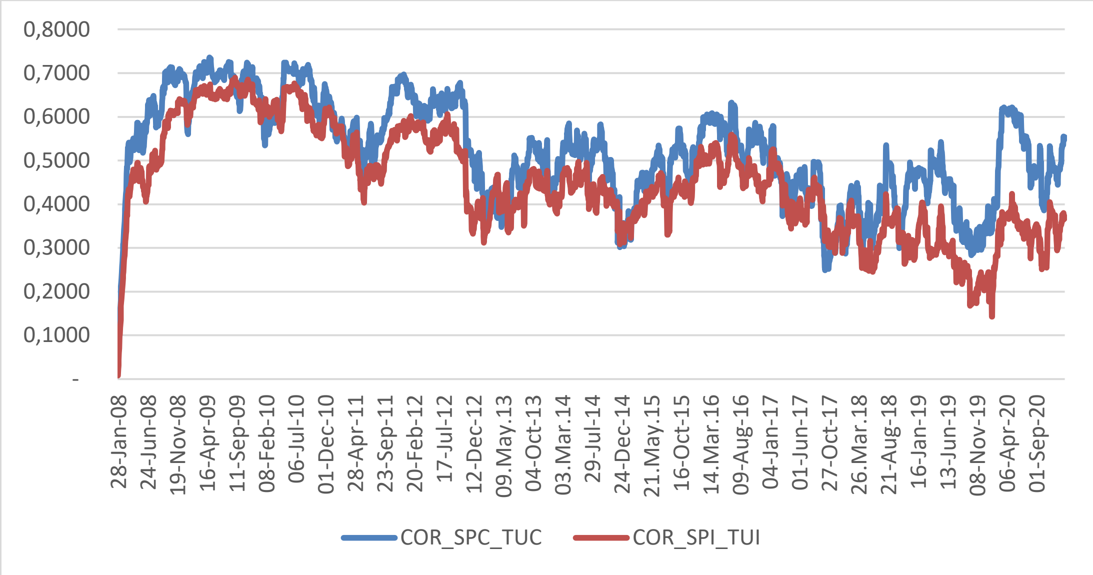


Figure 20 : Conditional Correlations of Coventional and Islamic Indices of Turkey and Spain

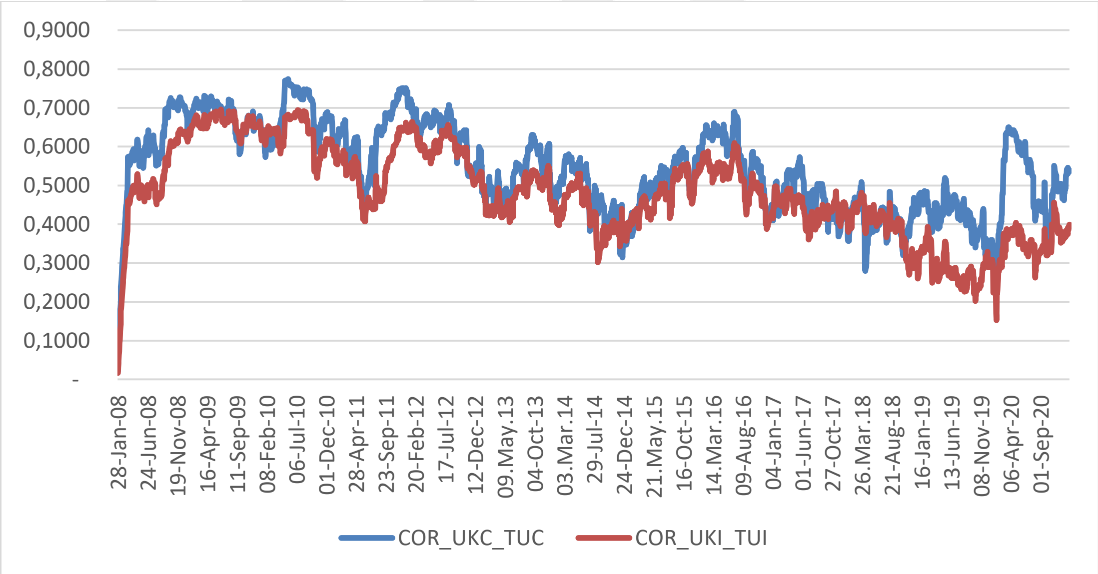


Figure 21 : Conditional Correlations of Coventional and Islamic Indices of Turkey and UK

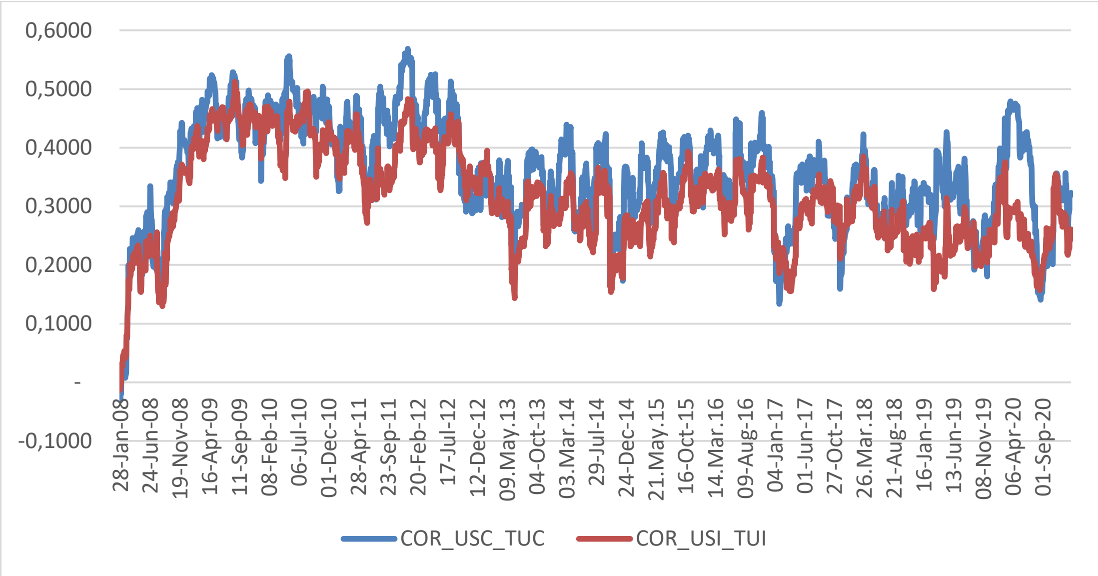


Figure 22 : Conditional Correlations of Coventional and Islamic Indices of Turkey and US

CHAPTER VI

CONCLUSION

This research aims to help Turkish equity investors identify potential portfolio diversification benefits by examining dynamic conditional correlations between Turkish stock index returns and the returns of the major trading partner countries namely, US, UK, France, Germany, Netherland, Italy, Spain, Russia.

The study is undertaken from two perspectives: Turkey-based conventional equity investors and Turkey-based Islamic equity investors. The multivariate GARCH-dynamic conditional correlation is used to evaluate the time-varying links between major trading partners' stock index returns, commencing on Jan 29, 2008, and ending on Jan 22, 2021.

The t-distribution model appears to fit better for capturing the fat-tailed nature of the distribution of boh conventional and Islamic stock index returns, according to maximum log-likelihood tests. The time-varying conditional volatility parameters of conventional and Islamic MSCI stock indices are found to be highly significant under the t-DCC model. This indicates that the shocks to the returns volatilities are not permanent, meaning that the riskiness associated with the stock returns may gradually diminish.

Furthermore, the analysis discovered that the most significant increases in conditional volatilities of both conventional and Islamic MSCI stock index returns occurred during the global financial crisis of 2008 and Covid-19 outbreak. In both cases, there seems a high level of convergence between worldwide stock markets, indicating a high level of market integration that may reduce diversification benefits for international investors.

The Turkish and Russian conventional and Islamic indices are recorded as the most volatile indices amongst the countries in the scope of this study.

Contradicting to the claim that Shariah screening (the prohibition of usury, excessive uncertainty and gambling) makes Islamic equities offer less risky, it is witnessed that Islamic stock indices follow a similar volatility path with its conventional counterparts.

On the contary, the same is not valid regarding correlations. It is observed that Islamic indices indicate less correlation compared to conventional indices with trading partners.

The time-varying conditional volatility parameters of conventional and Islamic MSCI stock indices provided that the lowest correlation exist between US and Turkey. This implies that both the conventional and Islamic MSCI indices of US provide more diversification benefits compared to Germany, France, Netherland, UK, Spain, Italy and Russia.

There are numerous significant implications for the Turkey-based equity investors, fund managers, and policy makers in this study. The findings of this paper may have several significant implications for the Turkey-based equity investors and fund managers looking to better understand return correlations between the Turkish stock index and the world's largest stock market indices in order to increase risk-adjusted returns through portfolio diversification. The findings on market shocks and the level of the Turkish market's interaction with cross-border markets may provide some beneficial insights in creating efficient macroeconomic stabilization strategies to avert a contagion effect in the domestic economy. Furthermore, the findings of the time-varying co-movements between these market returns may provide some useful information about the exchange rate risks that multinational firms face, thereby supporting their managers in developing their own internal control and risk management policies.

There are certain limitations to this paper. Nonetheless, it opens up a variety of avenues for further investigation. Other markets from different regions of the world can be included in this research. In order to provide a more thorough understanding of asset return relationships, furher studies can conduct additional methodologies such as Diebold-Yilmaz to analyze spillover effects, or wavelet coherence to analyze investment horizons.

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