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STOCK MARKET EFFICIENCY OF GULF COUNTRIES

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SCIENTIFIC ETHICS PAGE

According to the thesis writing guide of Tokat Gaziosmanpaşa University Graduate Education Institute, My Master's thesis named “Stock Market Efficiency of Gulf Countries” I have prepared under the consultancy of “Assoc. Prof. Dr. Oktay ÖZKAN” is based on scientific ethical values and rules. I hereby declare that it is an appropriate, original work, and I will accept any legal sanctions if it is determined otherwise.

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Iyas Fadhil Mohammed

JURY ACCEPTANCE AND APPROVAL

The defense exam of the thesis titled **"Stock Market Efficiency of Gulf Countries"** prepared by **Iyas Fadhil Mohammed** was held on August 31, 2023, and was unanimously accepted as a Master's Thesis by the following juries at Tokat Gaziosmanpaşa University Graduate Education Institute, Department of Business Administration, Branch of Accounting and Finance.

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In honor of my beloved father, who taught me the importance of hard work and perseverance.

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ABSTRACT

This study examines the time-varying stock market efficiency in seven Gulf countries, including Bahrain, the United Arab Emirates, Kuwait, Iraq, Oman, Qatar, and Saudi Arabia. For this purpose, we employ the wild bootstrap automatic variance ratio test with the help of the rolling sub-sample window approach on monthly stock market indices data spanning from May 2014 to January 2022. Our empirical findings reveal that the stock markets of Bahrain, the United Arab Emirates, Kuwait, and Iraq exhibit time-varying efficiency within certain periods of the study. On the other hand, the stock markets of Oman, Qatar, and Saudi Arabia are found to be market-efficient during the study period. The robustness of these findings is enhanced when employing an alternative econometric technique, namely the automatic portmanteau test. The empirical findings of this study suggest that there is a growing probability of making stock price forecasts and achieving abnormal returns in the stock markets of Bahrain, the United Arab Emirates, Kuwait, and Iraq.

Keywords: Stock market efficiency, Gulf countries, Time-Varying, WBAVR test, AQ test.

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ABBREVIATIONS

WBAVR	Wild Bootstrap Automatic Variance Ratio
EMH	Efficient Market Hypothesis
ARCH	Autoregressive Conditional Heteroskedasticity
GCC	Gulf Cooperation Council
LM	Lagrange Multiplier
BAX	Bahrain All Share Index
DFMGI	Dubai Financial Market General Index
FTFLKW	FTSE Kuwait All-Cap Index
ISX60	Iraq Stock Exchange 60 Index
MSX30	Muscat Securities Market Index
QSI	Qatar Stock Exchange Index
TASI	Tadawul All Share Index (Saudi Arabia)

INTRODUCTION

It is widely acknowledged that a well-operating stock market plays a pivotal role in facilitating an optimal allocation of resources. In addition, obtaining information through market prices was a fundamental aspect of ensuring the efficient allocation of resources. (Grossman & Stiglitz, 1980) Therefore, it was imperative for governing bodies to prioritize the establishment and advancement of a proficient stock market.

A substantial body of literature exists on the concept of market efficiency. However, previous studies have mostly focused on emerging markets, resulting in mixed findings (Charfeddine & Khediri, 2019). Remarkably, frontier markets, such as those found in the Gulf countries, have received limited attention despite their increasing significance throughout the years. The frontier markets exhibit certain distinguishing features, including volatility, restricted trading liquidity, insufficient regulatory and accounting frameworks, and variable currency valuations. Furthermore, a significant number of these nations are strongly dependent on commodities.

Moreover, it was noteworthy to mention that Gulf stock markets exhibited a comparatively recent establishment in comparison to their counterparts (Al Tamimi & Abu-Baker, 2021). Several stock exchanges, such as the Iraq Stock Exchange Market, Abu Dhabi Securities Market, Dubai Financial Market, and Doha Securities Market, were founded after the year 2000. Hence, it was imperative for scholars and professionals in the field to thoroughly investigate the efficiency of these markets in light of their distinctive attributes and institutional structures.

Given the need for the price discovery process to undergo a maturation period, it was improbable for established stock markets to exhibit immediate efficiency upon their inception (Fama, 1970). However, as market participants gained experience and the market system as a whole evolved, efficiency gains in these markets could be anticipated. Henceforth, a relevant research question will be whether or not these stock markets exhibit time-varying efficiency.

The research is structured into four distinct chapters. The initial chapter of the study encompassed an examination of the theoretical framework and the establishment of a clear definition of market efficiency (Kwok & Tadesse, 2005). This was followed by the identification and exploration of the underlying assumptions associated with market efficiency, an exploration of the many types of market efficiency, an analysis of the empirical evidence of market efficiency, and a comprehensive examination of the stock market within the Gulf countries. Chapter two of this research work focused on the comprehensive review of relevant literature and related studies. On the other hand, chapter three delved into elucidating the research methodology employed and presenting the analysis of the gathered data. The last chapter provided an analysis of the research's findings and presented the corresponding conclusions.

CHAPTER 1. THEORETICAL FRAMEWORK

1.1. INTRODUCTION

The chapter discusses a detailed clarification of the problem being investigated in addition to its significance. The anticipated outcome of the study's contributions and limitations are highlighted. Additionally, a summary of the sections comprising the research is present.

1.1.1. Discussion of the Problem

There has been a lot of discussion over the years over whether or not the dynamics of time affect the efficiency of the stock market in Gulf countries. Financial markets were efficient, as suggested by the Efficient Markets Hypothesis (EMH) (Fama, 1970). In the stock market, everything was priced instantly. However, this hypothesis has been questioned, in developing markets like those found in Gulf countries (Charfeddine & Khediri, 2019). These markets might have characteristics and be more susceptible, to information imbalances.

There have been investigations conducted to assess how effective stock markets are in the Gulf countries, but the results have been inconclusive. Some research has suggested that the stock markets in the Gulf region may be inefficient. For example, Al Hajieh and Redhead (2015) found that the Saudi stock market had a lack of efficiency. On the other hand, previous research has shown that market efficiency does exist in Gulf nations. For instance, Alsaifi and Saiti (2018a & b) conducted a study that indicated efficiency in the stock market of the United Arab Emirates (UAE).

The matter of time-varying efficiency in the stock markets of Gulf countries is highly important. This is because market efficiency can fluctuate over time due to variations in market conditions and participant behavior. When there is increased market volatility or major news events, such as economic crises, market efficiency may be impaired. Prices may deviate from their true values.

This study examines the time-varying efficiency of stock market efficiency in Gulf countries. To achieve this objective, time-series analysis techniques will be utilized to scrutinize the stock market's performance throughout the study period. Seven stock market indices based on data from Gulf countries are used for this study's monthly closing prices, specifically BAX, DFMGI, FTFLKW, ISX60, MSX30, QSI, and TASI, spanning from May 2014 to January 2022.

The current study's purpose is to enhance the current body of literature on the efficiency of stock exchanges in Gulf countries. This is achieved by analyzing the dynamic nature of market efficiency. As per the studies of Al-Zoubi and Al-Zu'bi (2007a & b), Alsubaie and Najand (2009a & b), and Rahman et al. (2017a & b), the identification of time-varying efficiency in the study would hold significant implications for both investors and policymakers. This is because it suggests that the market is more prone to informational asymmetries during specific periods.

To conclude, the matter of whether the variability of time affects Gulf countries' stock markets is noteworthy for their efficiency concern that holds consequences for investors, policymakers, and scholars. This current study aims to enhance the current corpus of knowledge regarding the efficiency of stock markets in the Gulf countries. The objective of this study is to analyze the time-varying market efficiency by examining the monthly closing prices of seven stock market indexes in Gulf countries. The data used in this analysis covers the period from May 2014 to January 2022.

1.1.2. The Current Study

This study is stirred up by the uncertainty surrounding the efficiency of securities markets in Gulf countries. Despite existing evidence and conclusions from market studies in Gulf countries, the question remains whether exploitable inefficiencies exist in emerging stock markets. The study focuses on analyzing the monthly closing values of seven stock market indices from Gulf countries, namely BAX, DFMGI, FTFLKW, ISX60, MSX30, QSI, and TASI, from May 2014 to January 2022.

Abdmoulah (2010a) demonstrated that all Gulf area markets are weak-form inefficient and extremely vulnerable to historical shocks. In addition, efficiency did not improve until the

second half of 2009, and it had a negative reaction to the crises of the time, except for brief periods of increased efficiency in the largest markets. This study aimed to cast light on whether or not Gulf stock markets are efficient and whether or not their efficiency is time-varying.

However, we can formula our question study as follows:

-Is the stock market efficiency in Gulf countries time-varying?

1.1.3. Significance of the Problem

The significance of this study lies in its ability to provide insights into how stock exchanges in the Gulf countries perform. The Efficient Market Hypothesis (EMH) states that stock prices efficiently incorporate all available information, making it difficult to predict future stock prices (Fama, 1970).

The hypotheses of our study are as follows:

H_0: The stock market efficiency in Gulf countries is not time-varying.

H_1: The stock market efficiency in Gulf countries is time-varying.

However, there was some uncertainty regarding the efficiency of securities markets in the Gulf region. The purpose of this study was to examine how market efficiency varied over time in the Gulf region and determine if there were any inefficiencies in the emerging stock markets of these countries. The results of this investigation have implications for investors and policymakers in Gulf nations and contribute to scholarly knowledge in finance. This study aims to improve our understanding of market efficiency by examining how it fluctuated in stock markets across Gulf countries. The results of this research are useful for shaping investment strategies in the region.

1.1.4. Contribution of the Study

This study aims to examine the time-varying efficiency of stock markets in Gulf nations. This area of inquiry was captivating due to its ability to reveal trends in the efficiency of the stock market over varying timeframes.

The current study provides observational evidence regarding the efficiency of stock markets in the Gulf nations. The present study employs data from seven stock market indices and covers a substantial time period, ranging from May 2014 to January 2022. The study proposal promises to generate significant empirical data on the stock market performance in the Gulf nations, thus making a valuable contribution to the present body of literature on the subject matter.

The goal of this investigation is to evaluate the reliability of the Efficient Market Hypothesis (EMH) in the Gulf region. According to Fama (1965, 1970, 1991), Roll (1988), and Shiller (2015), the Efficient Market Hypothesis (EMH) is a well-known theory in the field of finance. The research has the potential to contribute to the ongoing discussion about the validity of this proposition. By examining how well stock markets in Gulf countries align with the expectations of the Efficient Market Hypothesis (EMH), the study could provide insights into whether this theory applies in emerging economies.

The findings of the study have implications for investors and policymakers who are actively involved in the Gulf countries. The findings from the study have the potential to assist investors in making informed decisions regarding their investments in the stock exchange. Additionally, the results of the investigation may offer insights for policymakers when implementing regulatory measures and strategies to optimize the efficiency of the stock market.

1.1.5. Study Limitations and Problems

Data limitations: This study utilizes openly accessible data from seven stock market indexes in the Gulf countries. However, it is plausible that the data's quality and precision may be restricted. The presence of absent or inadequate data may potentially impact the outcomes of our investigation.

Interpretation of results: Various analysts may arrive at different conclusions about the importance and implications of the results gained from our investigation. This may have an impact on the final results of our investigation.

1.2. CONCEPT OF MARKET EFFICIENCY

The notion of market efficiency is an essential theory in finance that has been the subject of many academic and practical debates. It seeks to explain how financial markets work and whether prices accurately represent all available information. According to the study of Zhang & Wang (2022), anomalous profits are unlikely to be made in the financial markets since market investors are rational and prices of securities swiftly respond to all new information. In this chapter, we will define market efficiency and its underlying assumptions, describe the different types of market efficiency, and examine empirical evidence on market efficiency.

1.2.1. Definition of Market Efficiency

Market efficiency is a fundamental concept in finance that has been the subject of extensive academic and practical discussions. Black (1986) suggests that the prices of assets in markets always incorporate all the information, which makes it challenging for investors to make extraordinary profits. In line with Famas's (1970) explanation, a market is considered efficient when prices accurately reflect all information, as well as the immediate readjustment of stock prices to any new information. In this context, we will explore the definition of market efficiency, its underlying assumptions, and the implications of the efficient market hypothesis for investors.

1.2.2. Assumptions of Market Efficiency

Several fundamental presumptions comprise the foundation of the efficient market hypothesis and are necessary for its viability. First of all, it assumes that all investors exhibit rational behavior and strive to optimize their financial returns. This presumption is based on the notion that investors will maximize their profits and base their decisions on all available data. The second supposition is that every investor has equal access to all relevant information. This presumption is based on the notion that every market participant has free access to information and that no one has an unfair advantage over others. Thirdly, according to the papers of Barberis et al. (1998), Lo (2004), Chordia et al. (2005), and Cooper & Kaplan (2019), the hypothesis assumes that fresh information is released to the market at random. This presumption is based on the notion that new information is erratic and that it is hard to forecast when it will be made public. The final supposition is that trading doesn't involve

transaction fees. This presumption is founded on the notion that transaction costs may affect market prices and make it more challenging for investors to achieve abnormal returns.

These presumptions have been the focus of in-depth academic study and are essential for the efficient market hypothesis to remain true. For instance, according to Fama (1970), the efficient market hypothesis is based on the notion that investors make decisions and have access to all information. Malkiel (2003) further highlights the significance of the presumption that fresh information is released to the market at random. Numerous scholars, notably in several studies, including the works of Lo and MacKinlay (1988) and Jegadeesh and Titman (1993), have conducted empirical investigations on these hypotheses.

1.2.3. Types of Market Efficiency

There are three kinds of market efficiency: weak form, semi-strong form, and strong form efficiency, and the summary of these types is visualized in Figure 1.1.

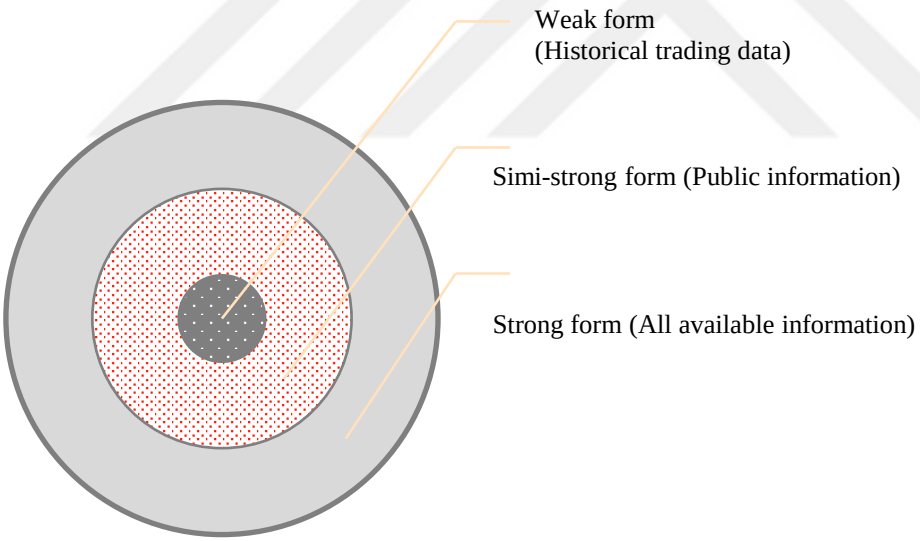


Figure 1.1. The Three Kinds of the Efficient Market Hypothesis

Source: (Yildirim, 2017:153)

1.2.3.1. Weak Form Efficiency

The concept of weak form efficiency suggests that existing stock prices already incorporate all market data, including past price sequences and returns. According to this hypothesis, the persistence of the form prevents investors from gaining returns. As a result,

techniques like analysis, which aim to predict stock prices based on charts, patterns, and technical indicators, do not provide any benefits. Al-Loughani (1995), Abraham et al. (2002a & b), Al-Khazali et al. (2007), and Al-Jafari (2013) suggest that, in line with the form efficiency hypothesis, stock prices exhibit a random walk pattern characterized by the independence of price changes and adherence to the criteria of weak-form efficiency.

This idea has been extensively explored in literature. Fama (1970) argues that past prices and returns do not offer information for predicting prices and returns under the weak-form efficiency hypothesis. The empirical proof presented by Lo and MacKinlay (1988) supports the notion that technical analysis does not generate returns. Malkiel (2003) suggests that the weak-form efficiency hypothesis aligns with the belief that stock prices follow a stochastic process..

1.2.3.2. Semi-Strong Form Efficiency

According to the semi-strong form efficiency hypothesis, stock prices incorporate all publicly accessible data, such as news, profits, dividend payments, new issuances, mergers, and acquisitions, impartially and expeditiously. As per the stated hypothesis, the utilization of fundamental analysis by investors does not result in the attainment of abnormal returns. The process of analysis involves an evaluation of a security's true value, taking into account various qualitative and quantitative factors. These factors encompass considerations related to politics, finance, and the economy.

This conjecture has been thoroughly examined in scholarly publications. According to Fama (1970), based on the semi-strong form efficiency hypothesis, stock prices reflect all publicly available information. According to Malkiel's (2003) empirical findings, the semi-strong form efficiency hypothesis is substantiated, as it is arduous to achieve abnormal returns through the utilization of fundamental analysis. Jegadeesh and Titman's (1993) research indicates that news announcements have a prompt and substantial influence on stock prices. This further supports the idea that the semi-strong form efficiency hypothesis is valid.

1.2.3.3. Strong Form Efficiency

According to the strong-form efficiency hypothesis, stock prices incorporate all pertinent information, encompassing a range of accessible market data information, to the

public as well as confidential data. As per this hypothesis, it is not feasible for investors to surpass the market performance due to the absence of exclusive access to privileged information within the market.

This postulation has been thoroughly examined in scholarly publications. According to Fama (1970), based on the the strong form efficiency hypothesis, stock prices integrate all available information, including private data. Nonetheless, many studies have challenged the theory of strong form efficiency. Lo and MacKinlay's (1988) and Lo's (1997) studies provide empirical support regarding the presence of insider trading in the stock market, indicating that non-public information can be leveraged to generate abnormal profits.

1.2.4. Empirical Evidence on Market Efficiency

The Efficient Market Hypothesis (EMH) has been the subject of considerable discourse within the field of finance, and the empirical findings have not yielded a definitive conclusion. While certain studies have offered backing for the hypothesis, others have presented evidence to the contrary. Empirical data indicates that although markets exhibit a degree of efficiency, there may be certain anomalies or inefficiencies that can be leveraged by investors to attain returns that deviate from the norm.

According to Fama's (1970) assertion, the Efficient Market Hypothesis (EMH) posits that stock prices incorporate all available information. Numerous research studies have successfully identified market anomalies, such as the momentum effect of Jegadeesh and Titman (1993) and the value effect of Fama and French (1992). These findings indicate that investors possess the capacity to generate abnormal returns by capitalizing on these market phenomena.

Additionally, contemporary research has demonstrated that the degree of market efficiency can differ among various markets and temporal contexts. A study initiated by Lo and MacKinlay (1988) reveals the existence of short-term predictability in stock returns, whereas the research conducted by Campbell and Shiller (1988) provides proof of long-term predictability in stock returns.

1.2.5. Conclusion

The theory of market efficiency is a fundamental financial notion that has been the focus of considerable academic and practical discourse. According to Fama's (1970) Efficient Market Hypothesis (EMH), financial markets are deemed to be rational and efficient. This theory suggests that securities prices are quick to adapt to new information, rendering it difficult to achieve abnormal profits. The paper of Jegadeesh and Titman (1993) has defined three different levels of market efficiency: weak form efficiency, semi-strong form efficiency, and strong form efficiency. These levels serve as indicators of the degree to which market prices reflect and incorporate all pertinent information that is currently accessible. Although the Efficient Market Hypothesis (EMH) has garnered significant theoretical support, the empirical data on market efficiency has yielded inconsistent results.

1.3. STOCK MARKETS IN GULF COUNTRIES

In recent years, the Gulf stock market indexes have become more significant due to the economic growth in Gulf countries. This chapter offers a review and analysis of seven major Gulf stock market indexes: BAX, DFMGI, FTFLKW, ISX60, MSX30, QSI, and TASI. The primary aim of this chapter is to examine the temporal evolution of each index.

1.3.1. Bahrain All Share Index (BAX):

The Bahrain All Share Index (BAX) serves as a metric for evaluating the performance of the companies listed on the Bahrain Stock Exchange. It was established in 1999, starting with a value of 1,000 points. The calculation takes into account the market capitalization of shares that can be freely traded (Bahrain Bourse, n.d.a.).

The establishment of the Bahrain Stock Exchange can be traced back to 1957, when the inaugural trading floor was created in Manama, the capital city of Bahrain. Initially known as the Bahrain Stock Exchange, it primarily focused on bond and currency trading. In 1987, it gained recognition from the government of Bahrain. Expanded its operations to include equity trading in Al-Murbati (2013).

In 1992, the Bahrain Stock Exchange underwent a major transformation and was restructured as a joint stock company. The exchange was then renamed the Bahrain Stock Exchange Company (BSE). The BSE continued to grow and expand its operations, and in

2001 it became the first exchange in the Middle East to be fully automated (Bahrain Bourse, n.d.b.).

Despite the challenges faced by the Bahraini economy in recent years, the Bahrain bourse has remained resilient and has continued to attract both domestic and international investors. In 2017, the BAX was rebranded as the Bahrain All Share Index (BASI). Moreover, the exchange has continued to provide new services to suit the changing needs of its investors (Bahrain Bourse, n.d.c.).

In conclusion, over the years, the Bahrain Bourse All Share Index (BAX) has significantly contributed to the advancement of the Bahraini economy. The index has faced various challenges, but it has continued to adapt and evolve to remain a key player in the regional financial markets.

1.3.2. Dubai Financial Market General Index (DFMGI)

The Dubai Financial Market General Index (DFMGI) is a stock market index that gauges the efficiency of the Dubai Financial Market (DFM), which is among the leading financial markets in the Middle Eastern region (Dubai Financial Market, n.d.). The DFMGI is composed of stocks from various sectors, including banking, real estate, and telecommunications. In this historical overview, we will explore the key milestones in the development of the DFMGI.

The Dubai Financial Market was created in March 2000 as a marketplace for trading securities in the United Arab Emirates (UAE). It started with a list of 17 companies. Aimed to offer businesses a way to raise funds and attract international investments.

The DFMGI was launched on March 28, 2007, starting with a base value of 1000. Its purpose was to represent the performance of the DFM and the companies it comprises. The DFMGI initially comprised 10 stocks, but its number of constituents has since increased to more than 30 (Dubai Financial Market, n.d.).

The DFM has made significant efforts to promote the DFMGI as a benchmark index for the UAE's financial markets. In 2010, the DFM launched exchange-traded funds (ETFs) based on the DFMGI, which enabled investors to gain exposure to the index's performance (Dubai Financial Market, n.d.). In 2017, the DFM launched a Shariah-compliant version of the DFMGI, known as the DFM Shariah Index, which was designed to attract Islamic investors (Dubai Financial Market, n.d.).

In conclusion, the DFMGI has come a long way since its launch in 2007, and it has established itself as a key benchmark index for the UAE's financial markets. Despite facing challenges over the years, the DFMGI has demonstrated its ability to adapt and evolve, and it remains an important indicator of the performance of the DFM and the wider UAE economy.

1.3.3. FTSE Kuwait All Cap Index (FTFLKW)

The FTSE Kuwait All Cap Index (FTFLKW) is a Kuwaiti equity market index that gauges the performance of the Kuwaiti stock market. Every company trading on the Kuwait Stock Exchange (KSE), Kuwait's main stock exchange, is an index constituent (FTSE Russell, n.d.). In this part, we will examine the important turning points in the FTFLKW's evolution.

The inception of the Kuwait Stock Market dates back to 1952 and was initially operated as a governmental entity. The KSE was later privatized in 1983, and it became a publicly traded company (Kuwait Stock Exchange, n.d.). Since then, the KSE has been instrumental in the growth of the Kuwaiti economy, attracting both domestic and international investment.

The FTFLKW was introduced in March 2018 through a collaboration between the KSE and FTSE Russell. Its purpose was to offer investors an assessment of the performance of the Kuwaiti stock market and serve as a reference point for investment products (FTSE Russell, n.d.). The FTFLKW covers companies from sectors including finance, industry, and services.

The launch of the FTFLKW marked a significant milestone in the development of the Kuwaiti stock market. The index's inclusion of companies of all sizes provided investors with a more comprehensive picture of the Kuwaiti equity market's performance. Additionally, the FTFLKW's launch was part of a broader effort to modernize the KSE and increase its attractiveness to foreign investors (Moodys.com, 2019).

In 2019, the KSE underwent a significant overhaul of its trading infrastructure, including the implementation of a new trading system and the launch of an electronic trading platform. These changes were aimed at improving the KSE's efficiency and transparency and increasing its attractiveness to foreign investors (Kuwait Times, 2019).

Despite hurdles and obstacles such as the COVID-19 pandemic and geopolitical tensions in the region, the FTFLKW has continued to perform well in recent years. In 2020, the index was included in the FTSE Global Equity Index Series, which further increased its visibility and attractiveness to international investors (FTSE Russell, 2020).

In conclusion, the FTFLKW has been instrumental in the growth of the Kuwaiti stock market and has provided investors with a comprehensive measure of the market's performance. Its launch in 2018 was a significant milestone in the modernization of the KSE, and the index's continued success demonstrates the resilience of the Kuwaiti economy.

1.3.4. Iraq Stock Exchange (ISX) Market Index (ISX60)

The Iraqi Stock Exchange (ISX) is an Iraqi stock exchange headquartered in Baghdad. Following the fall of Saddam Hussein's administration in 2004, the ISX was founded to expand the country's financial markets and support economic progress (Iraq Stock Exchange, n.d.).

The ISX60 is the main index of the ISX, measuring the performance of the efficiency of the top 60 exchange-listed companies. This index was launched in 2009 and is considered a barometer of the health of the Iraqi economy (Iraq Stock Exchange, n.d.).

In its early years, the ISX faced several challenges, including political instability, weak regulatory frameworks, and a lack of investor confidence (International Monetary Fund

(IMF), 2015). However, the exchange has made significant progress in recent years, with improvements in governance, increased transparency, and the introduction of new financial instruments (Iraq Stock Exchange, n.d.).

The Iraqi government has also made efforts to bolster the growth of the ISX by privatizing state-owned companies and implementing laws and regulations to enhance the business climate (World Bank, 2021a). These initiatives have played a role in attracting investments and promoting diversification within the nation.

In conclusion, the ISX60 has been critical to the progress of the Iraqi capital market. and its continued growth and success reflect the potential of the Iraqi economy. Despite the challenges that the ISX has faced, the exchange has made significant progress in recent years.

1.3.5. Muscat Securities Market Index (MSX30)

The Muscat Securities Market (MSM) serves as the stock exchange in Oman. It was founded in 1988 through the enactment of Royal Decree No. 7/88. The MSM has contributed to fostering the growth and advancement of Oman's economy and financial markets. The Muscat Securities Market Index (MSX30) is the primary index of the exchange, and it comprises the top 30 listed companies by market value.

The MSX30 index was released in June 1992 with a base capitalization of 100 points, and it has been calculated and disseminated by the MSM since then. The index captures the performance of the MSM's most actively traded companies, with banking, industrial, and service companies comprising the preponderance of the index's size.

During the initial years of the MSX30 index, the market was small and dominated by a few huge corporations, primarily in the banking and industrial sectors. However, as Oman's economy has grown and diversified over the years, the MSX30 index has seen significant changes in its composition, with new companies from various sectors, including telecommunications, real estate, and energy, joining the index.

In the past few years, the MSM has undertaken some measures aimed at boosting market transparency, efficiency, and liquidity, including the introduction of new products

such as futures and options contracts. These measures have helped to attract new investors to the market, and the MSX30 index continues to be a significant indicator of the performance of Oman's economy and financial markets.

1.3.6. Qatar Stock Exchange Index (QSI)

The Qatar Stock Exchange (QSE) is a stock market located in Doha, Qatar. It was founded in 1995 to create a space where companies can secure funding and investors can engage in securities trading (Qatar Stock Exchange, n.d.).

The QSI, which stands for Qatar Stock Exchange Index, serves as the indicator of the QSE. It assesses the performance of the exchange's 20 listed companies. Introduced in 2008, the QSI is widely regarded as a gauge for measuring the well-being of Qatar's economy (Qatar Stock Exchange, n.d.).

In its early years, the QSE faced several challenges, including a lack of liquidity and transparency, as well as regulatory hurdles. However, the exchange has made significant progress in recent years, with improvements in governance, increased transparency, and the introduction of new financial instruments (Qatar Stock Exchange, n.d.).

The QSI has also performed well in recent years, with a steady increase in market capitalization and trading volumes. In 2021, the index reached an all-time high, reflecting growing investor interest in the Qatari market (Gulf Times, 2021).

The Qatari government has also made efforts to promote the growth of the QSE by privatizing state-owned companies and implementing laws and regulations to enhance the business climate (World Bank, 2021b). These initiatives have successfully attracted investment. Contributed to the diversification of Qatar's economy.

In conclusion, the QSI has been instrumental in the growth of the Qatari capital market, and its continued growth and success reflect the potential of the Qatari economy. Despite the challenges that the QSE has faced, the exchange has made significant progress in recent years, and its prospects look bright.

1.3.7. Tadawul All Share Index (TASI)

The Tadawul All Share Index (TASI) serves as the benchmark for the stock market in Saudi Arabia. It evaluates the progress and success of the traded companies in the country. This index was created in 2004. Is overseen by Tadawul, also known as the Saudi Stock Exchange.

In its early years, the TASI exhibited minimal liquidity and limited foreign investor participation. However, in recent years, the index has experienced significant growth, with an increase in market capitalization and trading volumes (Gulf News, 2021).

The growth of the TASI has been influenced by a factor, which is the Saudi government's commitment to reducing the country's dependence on oil and diversifying its economy. To achieve this goal, the government has implemented reforms such as privatizing state-owned companies, introducing regulations to attract foreign investment, and creating a new sovereign wealth fund (El-Erian and Kumar, 1995; International Monetary Fund (IMF), 2021).

Another factor contributing to the growth of the TASI has been boosting foreign investor participation. In 2015, the Saudi government opened the Tadawul to direct investment by qualified foreign investors, a move that has helped to attract significant inflows of foreign capital (Bloomberg, 2021).

Despite its recent success, the TASI has faced several challenges over the years, including a lack of transparency, limited liquidity, and regulatory hurdles. However, Tadawul has taken steps to address these issues, including the introduction of new rules to improve corporate governance and transparency (Saudi Stock Exchange, n.d.).

In summary, the TASI has been instrumental in shaping the progress of the stock market and showcasing the possibilities of the Saudi economy. Although there are still obstacles to overcome, the government's endeavors to broaden horizons and attract investments, along with Tadawul's dedication to enhancing transparency and governance, instill optimism for a promising future for this index.

1.4. TIME-VARYING EFFICIENCY IN FINANCIAL MARKETS

The idea of time-varying efficiency refers to the variation in the performance of financial markets, which can be attributed to some factors, including changes in market structure, investor behavior, and economic events (Fama, 1970). The concept of marketplace performance relates to the degree to which the charges in a market correctly replicate the entire set of records to be had. The green marketplace speculation posits that once expenses are regulated promptly and precisely according to new information, buyers have restrained possibilities of abnormal profits, thereby signifying an efficient market. The fidelity of economic market efficiency has been a problem over the years. The perception beneath attention has been the issue of thorough investigation in scholarly works, in which various techniques were employed to gauge and verify the performance of those adjustments over the years. These techniques include ARCH (heteroskedasticity) and GARCH (generalized autoregressive conditional heteroskedasticity), as well as long memory estimation strategies such as the fractional lengthy reminiscence parameter and detrended fluctuation analysis (DFA) (Kilic 2004). Furthermore, Lo (2005) has placed forth the adaptive markets hypothesis and the martingale difference hypothesis as alternative rationales for market performance. Certain studies by Atilgan et al. (2015) a and b have detected instances of structural breaks in market efficiency.

1.4.1. Importance and Relevance to the Thesis

The idea of time-varying efficiency is distinctly applicable to the thesis on market efficiency in Gulf countries. Based on the research conclusion, it can be concluded that the Gulf nations' stock market efficiency is time-varying, with evidence of both short-term and long-term dependence. This finding highlights the importance of tracking market efficiency and thinking about the converting nature of market efficiency while making funding choices or designing regulatory regulations. Understanding the elements that contribute to the time-various nature of the marketplace Performance can provide useful data on the behavior of the financial markets and aid investors and policymakers in making informed decisions.

1.4.2. Literature Review on Time-Varying Efficiency in Financial Markets

Numerous researchers have tested in the realm of markets whether or not there is a concept called time-varying efficiency. Bollerslev et al. (1982) brought forth the notion of heteroskedasticity (ARCH) and also showed that volatility in economic markets is time-

various and can be modeled with the use of time-varying parameters. Bollerslev (1986) extended this framework to introduce the GARCH model (generalized autoregressive conditional heteroskedasticity), which has grown to be an extensively used tool for modeling time-varying volatility in monetary markets.

Subsequent research has targeted modeling other components of time-varying efficiency, along with time-varying correlations, time-varying chance premiums, and time-varying market liquidity. Lo and MacKinlay (1988) confirmed that the value of market performance might change over time based on the market's liquidity. Campbell and Shiller (1987) brought up the idea of time-various risk charges and confirmed that changes in the danger top class can give an explanation for variations in inventory returns over time.

Other research has tested the consequences of time-varying efficiency for investors and policymakers. For example, studies have proven that the converting nature of market efficiency can create opportunities for investors to earn unusual returns by exploiting marketplace inefficiencies (Chen and Knez, 1995). Policymakers need to be aware of the converting nature of market performance while designing regulatory regulations to guarantee that the markets are fair and that each buyer has access to equal facts (Fama, 1991).

CHAPTER 2. LITERATURE REVIEW

2.1. INTRODUCTION

The efficiency of stock markets, specifically in emerging markets, has garnered increasing attention nowadays. The inventory markets inside the Gulf nations have experienced substantial expansion and development, underscoring the importance of comprehending their efficiency. This literature review is intended to conduct a comprehensive assessment of the present-day frame of literature relating to the performance of stock markets inside the Gulf nations, with an important attitude. Through an evaluation of the prevailing state of scholarly inquiry referring to this concern count, our objective is to acquire deeper expertise on the capabilities, investment possibilities, marketplace growth, and styles within these monetary domain names.

2.2. EFFICIENT MARKET HYPOTHESIS (EMH)

The Efficient Market Hypothesis (EMH) is a framework that examines the efficiency of stock markets. Based on the EMH stock prices, which already incorporate all the information, it is difficult to consistently outperform the market using publicly accessible data. In other words, the efficiency of stock markets depends on how prices reflect all the necessary information. To better understand the EMH and its impact on markets, it is crucial to review existing works on this subject matter.

2.3. EMPIRICAL STUDIES ON STOCK MARKET EFFICIENCY IN GULF COUNTRIES

The literature on stock market performance in Gulf countries is vast and varied, with research using plenty of tactics and methodologies to study the problem. Overall, the evidence reveals that the efficiency of Gulf inventory markets varies over time. with each short-term period and long-term dependence. In this phase, we are capable of reviewing the empirical evidence of stock market efficiency in Gulf countries, drawing on the references supplied within the question.

The study conducted by **Butler and Malaikah (1992)** aimed to investigate the patterns of stock returns in Saudi Arabia and Kuwait during the period from 1985 to 1989. The findings of their study suggested that the Kuwaiti market displayed resemblances to listed markets in terms of individual stocks exhibiting statistically significant autocorrelations and price modification runs. On the contrary, it was observed that all 35 stocks in Saudi Arabia exhibited a departure from the stochastic process. Several institutional elements have been identified as contributing to the promotion of inefficiency in these markets. These variables include challenges such as illiquidity, market fragmentation, trading, and reporting delays, as well as the absence of official market manufacturers.

Hassan et al. (2003) conducted a study that differs from previous market potency literature on the KSE by examining weak-form efficiency while taking into consideration all options of the KSE. The testing methodology demonstrated the ability to recognize non-linearities and sporadic trading patterns within the KSE. The research employed EGARCH and GARCH M models as tests to ensure the reliability of findings regarding the changing risk premiums in the KSE. The findings suggest that the Karachi Stock Exchange (KSE) exhibits weak-form inefficiency, albeit with a noticeable improvement in efficiency towards the latter part of the 1990s. To enhance the informational efficiency of the KSE, it is recommended that policymakers focus on enhancing market liquidity, facilitating access to dependable and timely information, and reducing institutional constraints on trading.

Moustafa (2004) analyzed the stock price patterns on the UAE stock exchange using data from October 2001 to November 2003. It was found that the returns of all 43 sample stocks did not conform to a distribution. To test for randomness, parametric tests were employed. The findings revealed that 40 out of 43 random stock returns were statistically significant. The pilot study supports the weakness of the UAE stock exchange, which is characterized as a small and thin market with low trading volume.

Squalli (2006) examined the sectoral efficiency of the Dubai Financial Market (DFM) and the capital exchange of the United Arab Emirates (ADSM) in his study. The study utilized variance ratio testing. Except for the banking sector of DFM, it was discovered that the random walk hypothesis was falsified in every sector. It was observed that returns within

both markets were negatively correlated over time, indicating some market presence. Additionally, run tests indicated that only the insurance sector, in ADSM, exhibited weak form efficiency.

Using indexes from 1992 to 2004, **Rawashdeh and Squalli (2006)** conducted a study on the market efficiency of the four sectors of the Amman Stock Exchange (ASE). Their research results indicate that the stochastic process and weak form efficiency hypotheses were not supported in any of the sectors. This suggests that returns tend to revert to their values, resulting in increased volatility, exaggerated stock prices, and periodic market corrections that may be the result of a bubble effect. Consequently, it can be deduced that short-term investments in all ASE industries bear a high level of risk.

Al-Abdulqader et al. (2007) conducted the study that aimed to explain the concept of the market hypothesis (EMH) in relation to the stock exchange. The study investigated the presence of patterns in share returns that could enable investors to outperform the market based on historical data. Two trading techniques were put to the test using 45 companies' weekly data from 1990 to 2000. The study discovered backing for the Efficient Market Hypothesis (EMH) compared to previous research, even though it also identified indications of predictability in stock returns. The increased productivity of the stock market is likely a result of technologies and regulations implemented by the government.

In a study conducted by **Al-Zoubi and Al-Zu'bi (2007a),** they empirically investigated the returns of the Omman stock market (ASE). Their objective was to investigate market efficiency, uneven impact, and the risk-return relationship over time. To analyze equity returns, they used the Box-Jenkins model. In addition, they utilized the generalized conditional heteroscedasticity (EGARCH) model and threshold autoregressive conditional heteroscedasticity within the mean to assess volatility persistence, the risk-return relationship, and how volatility reacts to positive and negative news. The results demonstrated that the ASE index exhibited imbalance, excessive kurtosis values, and a deviation from a normal distribution. The empirical analysis suggested that the correlation between stock returns and the ARMA (1, 1) model indicated trading inefficiencies. In addition, their research revealed a

correlation between equity return and risk that is consistent with the principles of portfolio theory. In addition, the EGARCH model revealed uniform impact effects.

Asiri (2008) examined the behavior of stock prices on the Bahrain Stock Exchange (BSE) and evaluated its efficiency. The study analyzed the nonstationarity of expenses for publicly traded companies listed on the Bombay Stock Exchange (BSE) by employing unit root and Dickey-Fuller tests. Additionally, the author analyzed integrated moving averages (ARIMA) and exponential smoothing techniques. According to the findings of this study, all daily stock expenses and each sector adhere to a stochastic process devoid of drift or trend. In addition, additional analyses, such as ARIMA (AR1) autocorrelation and exponential smoothing, confirmed the efficiency of BSE.

Elango and Hussein (2008) conducted a study to analyze the efficiency of the market in the seven stock exchanges of the Gulf Cooperation Council (GCC). The study analyzed market indicators from October 2001 to October 2006 utilizing the Kolmogorov-Smirnov test. The study's effects indicated that the null hypothesis, which posits that revenues comply with an ordinary distribution, was rejected by all seven markets. The research additionally discovered that the conjecture of stochastic walking and feeble performance of Gulf Cooperation Council markets turned into invalidated for all seven markets in the course of the look-at period, in keeping with antecedent studies accomplished in the milieu of the Gulf Cooperation Council and nascent and growing markets. The necessity of a unified stock marketplace for the various member countries of the Gulf Cooperation Council (GCC) was emphasized with the aid of the authors.

Furthermore, the aim of the research of **Abdmoulah (2010b)** was to examine the possibility of stock market efficiency over the past decade, which may be attributed to advancements in structure and learning among agents. The research utilized a dynamic weak-form efficiency examination that incorporated the GARCH M (1,1) methodology and state space time-varying parameters. The research focused on periods up until March 2009. The results revealed that previous shocks had an effect on all of the markets, and they exhibit weak-form inefficiency. Furthermore, the enhancement of efficiency does not exhibit any progress towards the initial quarter of 2009 and showcases an adverse response to concurrent

crises, except for momentary sub-intervals of efficiency enhancement for the most extensive markets.

In a study conducted by **Al-Jafari (2011),** the aim was to explore the accuracy of the walk hypothesis (RWH) and assess how efficient the stock exchange in Bahrain is in its form. To achieve these observations of Bahrain, all share indexes were analyzed using statistical tests, including the test for serial correlation and the Dickey-Fuller (unit root) test. These tests were employed to examine the stochastic properties and dynamics of the Bahrain stock exchange. Based on what was discovered through this research, it can be concluded that the Bahrain Stock Exchange demonstrates a low level of informational efficiency. This means that investors have opportunities to make profits by utilizing patterns of stock prices, trading volume information, and other market-generated data.

Salameh (2011) conducted research on twelve stock markets, including Saudi Arabia, Amman, Kuwait, Dubai, Abu Dhabi, Egypt, Morocco, Tunisia, Qatar, Oman, Bahrain, and Palestine. Using experiments, the study examined the walk hypothesis (RWH) to comprehend the randomness and behavior of these markets. The findings indicate that the behavior of the eleven stock markets examined is not random. The results from tests, like autocorrelation and run tests, reveal that among all the markets studied, Saudi Arabia's stock market demonstrates behavior but at a slower pace. Additionally, it has been concluded that all twelve Arab stock exchanges exhibit inefficiency based on both the ADF and PP unit root tests, the Dickey-Fuller (ADF) and Phillips Perron (PP) tests, respectively.

Harrison and Moore (2012) conducted a study on the efficiency of stock markets in emerging markets in the Middle East and North Africa (MENA) region. They aimed to validate the research conducted by Abdullah (2010), who found that despite growth and efforts to improve market functioning, the MENA markets still exhibit inefficiencies. Harrison and Moore (2012) employed a methodology that extends Abdullah's approach (2010) to test evolving market efficiency. The results were generally consistent with Abdullah's findings.

In addition, recent economic methods were used in an investigation of the Amman Stock Exchange (ASE) indexes' behavioral characteristics undertaken by Elbarghouthi et al.

(2012). Models with good prediction performance for each index were created using Box-Jenkins estimation, but these models did not adhere to the requirements. The unit root test of the Efficient Market Hypothesis supported these findings by demonstrating that all the processes were stable and that there was no evidence of a unit root in the return series for any of the indices.

The study conducted by **Al-Ashikh (2012)** sought to explore the credibility of the Randomized Walking Hypothesis (RWH). Specifically, they evaluate the efficiency of earnings in the stock market. This market holds importance as one of the leading stock exchanges in the Middle East and North Africa region. This was achieved through a sequence of consecutive and non-serial enfranchisement tests. The investigation also examined the presence of weekday effects. The study's findings indicate that the securities market in Saudi Arabia shows a level of written dependence. Additionally, the outcomes of the sequencing tests strongly rejected the hypothesis of market efficiency. As a result, the study concluded that the Saudi securities market displayed inefficiency in adhering to the form of the market hypothesis. The findings also suggest that there are weekday effects on the stock market, which can be observed in both the volatility equations.

Asiri and Alzeera (2013) examined the inefficiency of the Saudi Arabian stock exchange known as Tadawul's feeble form market. Tadawul is anticipated to walk in a particular manner. From October 15, 2006, to November 15, 2012, the researchers collated the closing prices for the all-share index and sectoral indices on Tadawul. They utilized tests such as the unit root Dickey-Fuller test, the Pearson correlation test, the Durbin Watson test, and the Wald Wolfowitz runs test to determine if there was non-stationarity in the prices of all listed companies and individual market sectors. The results of these four experiments confirmed that the Saudi Arabian stock market is inefficient in terms of both share prices and 11 specific sectors.

Asaad's (2014) study sought to determine the weak-form efficiency of the Iraq Stock Exchange (ISX) concerning each bank that is listed on the exchange. The study utilized monthly data spanning a period of 10 years (2004–2014). According to the study, it was observed that each bank exhibited inefficiency in its weak form. The study's findings suggest

that the stock prices of banks listed on the Iraq stock exchange do not fully incorporate historical information. Consequently, there exist opportunities to gain abnormal profits by utilizing past stock prices to forecast future stock prices.

Almujamed et al. (2015) examined the weak-form efficiency of the Amman Exchange (ASE) in a study of a similar nature. The study examined a sample and three sub-periods between 2000 and 2012. Utilizing statistical analyses and moving rules, the efficiency of the ASE was evaluated. The findings indicate that the ASE is inefficient when trading rules are implemented. The empirical findings also suggest that moving methods outperformed the buy-and-hold strategy in predicting returns for the ASE index. Notably, the results related to the sub-periods indicate that the Amman stock exchange has improved its efficiency. This progress may be ascribed to contemporary advancements, including the implementation of novel legislation and the establishment of market microstructures.

Asaad et al. (2015) conducted a study in Iraq intending to determine the stock market's weak form efficiency. From April 1, 2010, to July 1, 2014, the researchers analyzed the closing prices of the market on a daily basis. Various statistical tests were utilized to evaluate the normality and randomness of the data. This included the Kolmogorov-Smirnov, Shapiro-Wilk, Cramer-von-Mises, Watson, and Anderson-Darling tests. The Dickey-Fuller, Phillips-Perron, Run, and autocorrelation tests were augmented. The findings of the study indicate that the Iraqi stock exchange is inefficient in its current state. This suggests that investors may be able to generate abnormal profits by using historical prices to predict future prices.

Jamaani and Roca (2015) set out to examine market efficiency in the stock exchanges of the six member states of the Gulf Cooperation Council (GCC): Bahrain, Kuwait, Oman, Saudi Arabia, and the United Arab Emirates (excluding Qatar). The study relied on data consisting of indicators from these markets. Data collection occurred on a daily basis from January 1, 2013 to December 30, 2017. To understand the characteristics of the data and assess its stationarity, descriptive statistics and unit root tests were employed, respectively. The research also utilized tests in combination with running tests to validate the nature and efficiency of stock price fluctuations. Results revealed that not a single one of the five stock

markets examined demonstrated a walking pattern. Thus, the hypothesis of inefficiency was debunked across all instances.

Charfeddine and Khediri (2016) investigated the time-varying changes in market efficiency in the stock markets of the Gulf Cooperation Council (GCC). The duration of their investigation was from May 2005 to September 2013. A general autoregressive conditional heteroscedasticity in the mean (GARCH M) model with a state space time-varying parameter (Kalman filter) and a rolling technique sample test of the fractional long memory parameter were employed by the authors. They utilized techniques such as detrended fluctuation analysis (DFA), modified R/S statistics, exact local Whittle (ELW), and feasible exact local Whittle (FELW) to estimate memory. Additionally, they utilized the Baic and Perron break techniques to examine and determine when market efficiency varied over time. The findings of their analysis revealed that GCC markets demonstrated time-varying efficiency, with periods of improvement observed. The findings also demonstrated the existence of interruptions in all Gulf Cooperation Council (GCC) markets. Moreover, Charfeddine and Khediri (2016) observed that contemporary economic disruptions such as the Arab Spring and subprime crises have influenced the evolution of market efficiency over time.

A study was undertaken by **Awan and Subayyal (2016)** to examine the degree of market efficiency in six stock exchanges situated in the Gulf area. The study was conducted for five years. The research employed the closing stock indexes of Muscat and Oman, the UAE, Kuwait, Saudi Arabia, Bahrain, and Qatar for analysis. The data was collected from January 1st, 2011 to December 31st, 2015. Autocorrelation and run tests were conducted as part of the analysis. The results obtained from both examinations suggest that the stochastic process model is not universally relevant to stock prices in all Gulf markets. Furthermore, the analysis of the autocorrelation coefficient has led to the conclusion that the null hypothesis of poor form efficiency is not supported at various time intervals.

Alam et al. (2016) conducted a study and presented an appraisal on whether or not stock exchanges within the Organization of Islamic Cooperation, or "the OIC," enhanced their efficiency between certain operating periods utilizing an analytical principle known as the weak-form efficient market hypothesis (EMH). The authors conducted an investigation and

evaluation of the efficiency rankings of stock markets in the Organization of Islamic Cooperation (OIC) using the Autoregressive Integrated Moving Average (ARIMA) and Generalized Autoregressive Conditional Heteroscedasticity (GARCH) models. The available data suggests a generally favorable trend within the Organization of Islamic Cooperation (OIC), which may be attributed to several factors like regulatory reforms, technical improvements, investor attitudes, and education. This tendency can be explained by the maturation and increased efficiency of dynamic, high-perfrming markets over time..

Hawaldar et al. (2017) particularly cover the years between 2011 and 2015 and focus on the Bahrain Bourse, which was to investigate market efficiency in terms of individual stocks. This research looked at the weak version of EMH by using the Kolmogorov-Smirnov goodness of fit test, the run test, and the autocorrelation test. The findings suggest that the movement of stock prices was not random. Seven companies' share prices did not behave like random variables during the simulation. Share prices have been found to have weak-to-balance correlation variables, with values ranging from negative to positive, according to autocorrelation testing. The study's contradictory findings make it hard to draw any firm conclusions about Boursa Bahrain's level of efficiency.

In a study conducted by **Al Barghouthi and Ehsan (2017),** they investigated the Moving Average (MA) methodology, which is a tool used in analysis to determine appropriate investment positions at any given time. The research focused on comparing MA (one day) with MAs and zero filters. By comparing the results against the market hypothesis, it was confirmed that applying the MA technique can lead to returns. This suggests that the ASE operates inefficiently at a weak level, presenting opportunities for traders to earn profits. The study specifically examined five indices within the market to further support this hypothesis.

In their study, **Hamid et al. (2017**) performed research to investigate the degree of efficiency in stock market returns across various nations within the Asian Pacific area. Data was collected regularly spanning from January 2004 to December 2009. Conducted a range of statistical analyses, encompassing Autocorrelation, Ljung Box Q statistic test, Runs test, Unit Root test, and Variance ratio. The findings of the study revealed that there was no discernible

trend in stock prices across all the countries examined. This implies that investors have the opportunity to exploit opportunities through arbitrage in these marketplaces.

Khudair and Al-Rubaie (2017) researched the importance and role of Gulf capital markets in enhancing efficiency and supporting the Gulf economy. The study examined Iraqi market indicators and ways of developing them and found that the Saudi money market was effective at the low level, while the Iraqi stock market was low at the low level using tests (Durat, Friedman) for both countries.

In their study, **Syed and Bajwa (2018)** aimed to analyze the response of the stock market to revenue releases through the utilization of the event study approach. The researchers also evaluated the Efficient Market Hypothesis (EMH) about the stock market and employed the market model to compute expected and unexpected returns during the specified timeframe. The results of the study suggest that the Saudi stock market exhibits a deficiency in its approach to achieving effective financial management.

Olubiyi and Olopade (2018) conducted a study to examine the efficiency of securities markets in countries that are affiliated with international organizations, employing the random walk hypothesis and the volatility technique. In this study, the researchers analyzed data from stock market indexes, covering the period from January 2005 to April 2016. The study involved doing many tests, such as analyzing the constant (variance ratio; homoskedastic and heteroskedastic martingale) and statistic (Wright rankings and scores) tests, along with ARCH-type estimates. The results of our study revealed that the stock market in Qatar demonstrated insufficient efficiency. It has been observed that the monthly stock returns of countries affiliated with the International Organization exhibit a considerable degree of unpredictability, with Qatar displaying the highest level of volatility. Investors ought to demonstrate awareness of these unexpected events when considering the trade-off between risk and return in their portfolio choices. Additionally, authorities should develop protective mechanisms to safeguard the market against the potential disadvantages arising from unequal access to information, as shown by the research findings.

The objective of **Meero's (2018)** study was to establish two points. The first objective was to evaluate the efficiency of the stock markets in the Gulf Cooperation Council (GCC)

nations of Abu Dhabi, Bahrain, Dubai, Kuwait, Oman, Qatar, and Saudi Arabia**.** Secondly, it aimed to establish a correlation between the returns of these markets. To conduct this investigation, daily market index prices were collected from the websites of these stock markets, and various statistical techniques were employed to evaluate the hypothesis of a stochastic process. In terms of weak form efficiency, the Gulf Cooperation Council's stock markets were found to be inefficient.

In a study conducted by **AL-Shakurji and Chaqmaqchi (2019),** they aimed to assess how effective the growing stock markets in the Middle East region are. The researchers analyzed the data to assess the credibility of the random walk hypothesis (RWH). A series of tests were performed to examine the presence of calendar impacts in five prominent rising economies situated in the Middle East. The results of their RWH model were not universally accepted across all markets, suggesting that there are calendar effects on equity returns in these countries. Compared to the other markets included in their study, the evidence presented at the Tel 100 Israel stock exchange indicates a level of support for RWH.

In their study, **AL-Shakurji and Chaqmaqchi (2019)** sought to evaluate the Iraq stock exchange's weak form efficiency. For their analysis, they employed the ADF and PP models. To analyze the distribution of Iraq exchange index closing prices from 2016 to 2019, statistical tests like Jarque Bera were employed. The findings indicated that the market demonstrates inefficiency in its form since there is a lack of distribution in the weekly data. The study recommends implementing measures to improve efficiency at all levels within the exchange.

Recent research by **Ghalayini and Alkees (2019)** analyzed the performance of six Gulf stock markets: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. The study analyzed data from January 2007 to December 2016. The researchers used the Augmented Dickey-Fuller (ADF) test to investigate whether there were unit roots in the stock returns. They discovered evidence of nonstationarity in all markets. Additionally, they employed the Variance Ratio (VR) test to assess the weak form efficiency of these markets. The findings revealed that, except for Oman, the markets were efficient.

The objective of **Lamouchi's (2020)** study was to investigate the level of efficiency exhibited by the securities market in Saudi Arabia, with a specific emphasis on the Tadawul All Share Index (TASI) throughout the period spanning from 1998 to 2020. This study aims to evaluate market efficiency through an analysis of the correlation between exchange index returns and volatility. The findings suggest that the Saudi exchange shows consistency over time, challenging the principles of the market hypothesis (EMH). Additionally, using the ARFIMA model provides evidence of a persistent correlation in the past volatility of the Saudi stock market, further questioning the Efficient Market Hypothesis. Overall, Lamouchi's (2020) study sheds light on the limitations of EMH in Saudi Arabia's securities market. Highlights the importance of conducting research in this area.

The study conducted by **Al-Hatem et al. (2020)** aimed to assess the weak-form efficiency of the Iraq stock market index (ISX60) through the utilization of the stochastic process model. The daily returns from 2015 to 2019, consisting of 1,164 observations, were analyzed. The hypothesis was examined using tests such as the Serial Correlation test, Unit Root tests, Variance Ratio, and Rescaled Range test. The findings revealed that the returns of the ISX60 market index do not follow a pattern. This indicates the Iraqi stock market is inefficient at the feeble form level, which in turn raises the possibility of rational investors achieving returns and increasing their risk.

In a similar vein, **Al-Zubaidi and Al-Kaabi (2021)** assessed the efficiency of the stock exchange based on its weak form efficiency. Using the walk model, they analyzed the equity returns of fourteen industrial companies over five years, from January 2015 to December 2019. The results demonstrated that the Iraqi stock exchange is inefficient at the weak form level. This is evident from the dependence between company returns that deviate from a pattern.

2.4. CONCLUSION

In brief, through this research, we have thoroughly analyzed the efficiency of stock markets in Gulf countries. Our findings indicate that, as a trend, these markets exhibit weak form efficiency. Nonetheless, it is essential to highlight the variability in such time-varying efficiency and externalities affecting its flux state, such as market trends and investors'

behaviors based on their perceptions and traditional beliefs, thereby influencing key indicator metrics, which can significantly impact its levels of success or downward trajectory. The exact nuances behind these phenomena require further observation via fresh scholarly literature.

CHAPTER 3. DATA AND METHODOLOGY

3.1. DATA

This study gathers information on the stock market indicators (BAX, DFMGI, FTFLKW, ISX60, MSX30, QSI, and TASI) of the Gulf countries (Bahrain, United Arab Emirates (UAE), Kuwait, Iraq, Oman, Qatar, and Saudi Arabia).

We obtained the monthly closing prices of stock market indicators from May 2014 to January 2022 by downloading them from the webpage www.investing.com.

The calculation of returns is performed in the following manner:

$$r_{it} = \ln\left(P_{it} / P_{i(t-i)}\right) \times 100 \quad (1)$$

In Equation 1, ln() indicates the natural logarithm, and P_{it} and $P_{i(t-1)}$ are the closing prices of a given index i on day t and $t-1$, respectively.

By utilizing this data from stock markets in Gulf countries, our study examines the time-varying stock market efficiency.

Figure 3.1 displays time series graphs depicting the monthly closing prices and returns of the seven indices. The data collected for analysis spanned from May 2014 to January 2022, every month, data points are recorded. The analysis of the data reveals distinct results observed in the stock market across multiple indices. The specific findings will now be presented in detail.

The BAX index diagram illustrates the analyzed data, which exhibits relatively smooth fluctuations. Despite having an average value of 0.25, the data can be considered to display a predominantly static pattern. Throughout the study period, these data have fluctuated between a minimum value of -20.65 and a maximum value of 6.76. It is worth noting that these extreme values occurred within a very short time interval. Specifically, the lowest value was observed in January 2020, while the highest value was recorded in August 2020. For the remainder of the study period, a relatively consistent behavior is observed. The DFMGI index

graph displays significant fluctuations in the data during the initial phase of the study period. Within a short timeframe from the beginning, the highest value of 20.36 was recorded in July 2014. However, shortly after, the index demonstrates relatively consistent behavior with an average of -0.5. Eventually, it reached its lowest point of -37.99 in January 2022, similar to the previous index. Notably, the DFMGI index exhibits a substantial difference between its maximum and minimum rates. The FTFLKW index graph reveals that the data examined initially displayed multiple local minimum values. However, in January 2017, it reached its highest value of 11.90. From that point onwards until March 2020, the index exhibited predominantly static behavior, with the lowest recorded value being -25.96 and an average of 0.25. Notably, similar to the previous two indices, the maximum rate was recorded in January 2020 in this index as well. The FTFLKW index demonstrates a substantial difference between its maximum and minimum rates. The ISX60 index exhibits significant fluctuations in the analyzed data, with multiple instances of distinct maximum and minimum points. These fluctuations resemble seasonal patterns, indicating that the index displays behavior similar to seasonal fluctuations. The average of this index is -0.602. The minimum value of -13.46 was recorded in January 2016, while the maximum value of 13.94 was observed at the end of the reviewed period on February 2021. Notably, this index has a significant difference between its maximum and minimum rates.

The MSX30 index demonstrates significant fluctuations in the analyzed data, particularly during the initial phase of the period under review. The highest value in this index, reaching 8.33, occurred in April 2016. From that point until March 2020, the index displayed relatively consistent behavior, with the lowest recorded value being -18.06. The average for this index is -0.514. Similar to the first two indices, the maximum value in this index was recorded at the same time. Additionally, the MSX30 index displays a contrast between its lowest rates.

The QSI index graph displays prolonged and closely spaced fluctuations in the analyzed data. At the beginning of the period, the index recorded its highest and lowest values of -17.55 and 11.40 in June 2014 and July 2014, respectively. Although there is a substantial difference between the overall minimum and maximum rates in this index, the average value is close to zero. Additionally, in March 2020, a local minimum rate can be observed,

coinciding with the overall minimum rate seen in the previous indices. Notably, the difference between the lowest rates in this index is quite significant.

The TASI index chart illustrates long fluctuations and numerous instances of local minimum values, which are frequently observed throughout the chart. A cluster of these values is noticeable at the beginning of the studied period, with an overall minimum value of -19.01 recorded on Aguastus 2015. Following several distinct local minimum values, the overall maximum value of 15.21 was recorded in November and December 2016. Interestingly, a local minimum value coincides with the minimum value observed in other indices. The average of this index is 0.25, and there is a temporary stationary state observed in the middle of the analyzed data.

3.2. METHODOLOGY

The methodology of this study to examine stock market efficiency in Gulf countries involves employing a range of tests and statistical analyses. These evaluations aim to understand the nature of stock market efficiency and find out if the efficiency of their indexes is time-varying.

To assess the efficiency of Gulf stock markets, we utilize the Wild Bootstrap Automatic Variance Ratio (WBAVR) test and the AQ test. Additionally, we employ statistics such as the Jarque Bera test, ADF test, and ARCH LM test to analyze the characteristics of stock market indices.

In our study, we also utilize the portmanteau test as an econometric technique to reinforce the findings.

By conducting these tests, we gain insights into study period dependence within the stock market indices. This highlights how various factors interrelate in determining market efficiency.

Our study underscores the importance of considering market efficiency when making investment decisions or formulating regulations. To assess the efficiency of Gulf stock

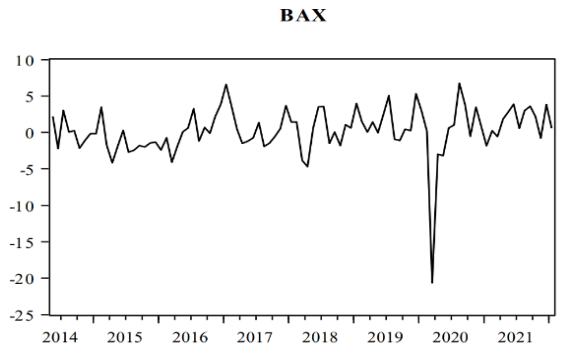
markets, two tests were conducted: the Wild Bootstrap Automatic Variance Ratio (WBAVR) test and the AQ test.

Table 0.1. Descriptive Statistics

	Indices						
	BAX	DFMGI	FTFLKW	ISX60	MSX30	QSI	TASI
Mean	0.254	-0.501	0.250	-0.602	-0.514	-0.014	0.257
Minimum	-20.654	-37.994	-25.961	-13.462	-18.061	-17.559	-19.018
Maximum	6.764	20.362	11.908	13.940	8.336	11.408	15.214
Std. dev	3.261	7.380	4.540	4.831	3.625	5.173	5.991
Skewness	-2.639	-1.371	-2.128	0.061	-1.342	-0.705	-0.585
Kurtosis	19.438	10.570	13.774	3.881	8.233	4.143	3.979
Jarque-Bera	1154.985***	251.219***	520.086***	3.072	134.075***	12.772***	9.024**
ADF	-7.101***	-11.555***	-8.521***	-8.326***	-9.888***	-10.974***	-8.877***
ARCH LM	0.755	3.026	0.811	6.905	1.829	4.796	11.679

Notes: *** and ** denote significance at 1% and 5% level. ADF indicates the Augmented Dickey-Fuller test for unit root. ARCH LM indicates the Lagrange Multiplier test for Autoregressive Conditional Heteroscedasticity with 10 lags.

(a)



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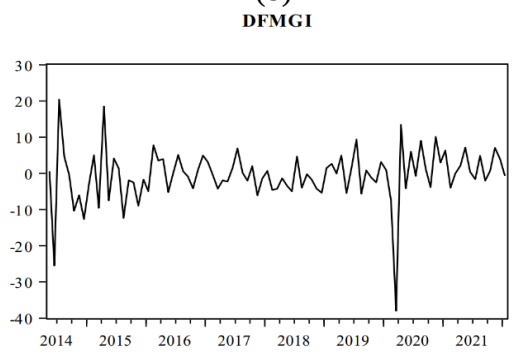

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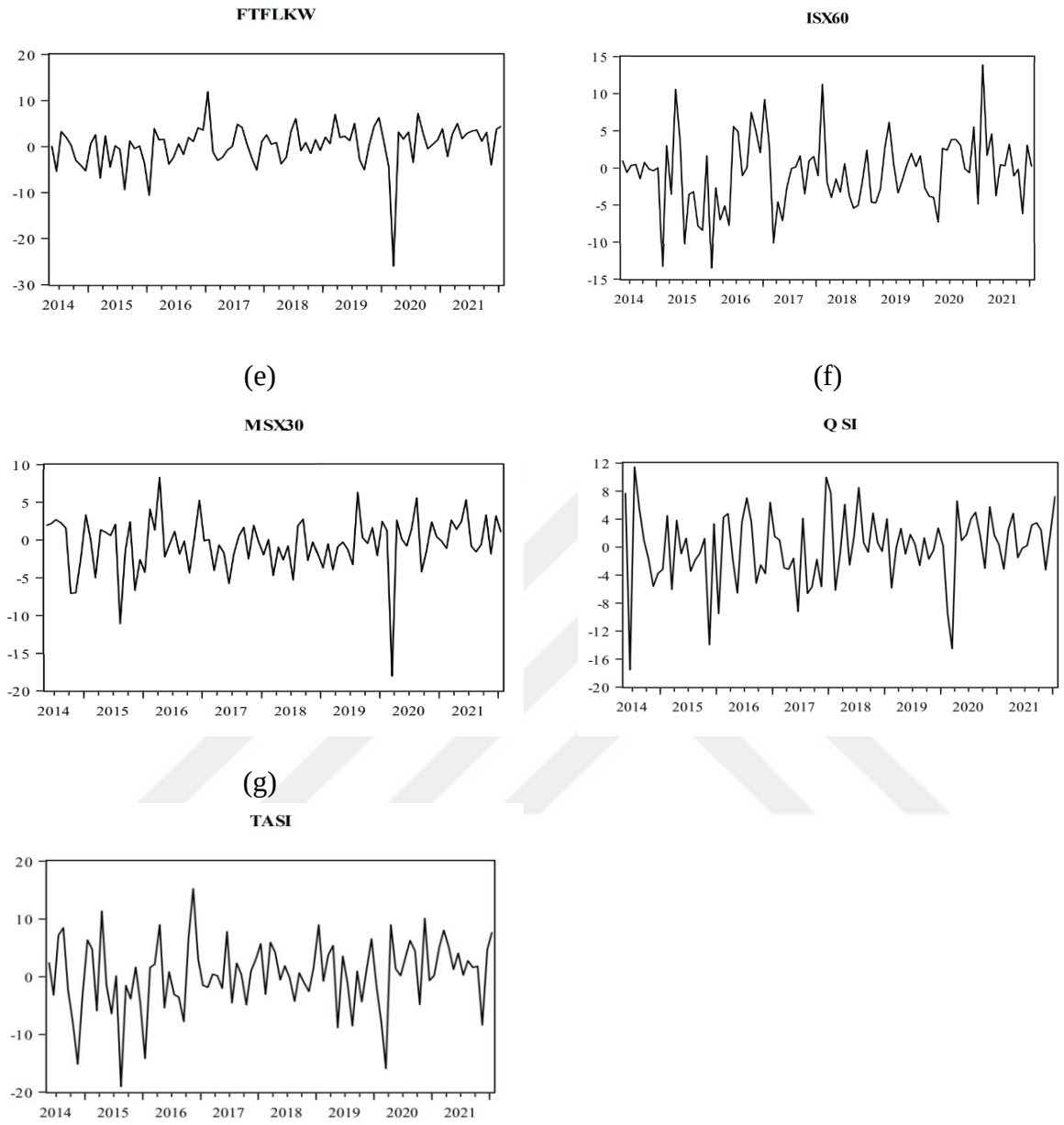


Figure 0.1. Monthly Time Series Returns of Stock Market Indices for the Period from May 2014 to January 2022

Note: (a) Monthly returns of the BAX index of Bahrain; (b) Monthly returns of the DFMGI index of the United Arab Emirates; (c) Monthly returns of the FTFLKW index of Kuwait; (d) Monthly returns of the ISX60 index of Iraq; (e) Monthly returns of the MSX30 index of Oman; (f) Monthly returns of the QSI index of Qatar; (g) Monthly returns of the TASI index of Saudi Arabia.

3.2.1. The Jarque-Bera Test

In the field of analysis, having an understanding of how data is distributed is extremely important in figuring out the most suitable methods for analysis. Parametric statistical techniques are commonly employed when data follow a normal probability distribution. This topic has garnered significant attention from researchers in the field of statistics. Statistical inference methods often depend on the assumption that the underlying population follows a distribution.

To assess whether a collected sample is derived from a normal population, various tests known as normality tests are utilized. One such test, called Jarek's normality test, is specifically designed to examine the normality of residuals in time series analysis.

A commonly used "Goodness of Fit" test is the "Jarque-Bera Test", which assesses the conformity of data to a normal distribution based on skewness and kurtosis indices. This test measures the vertical and horizontal symmetry of the normal distribution, as quantified by skewness and kurtosis. Let § represents the "Sample Skewness" and K represents the "Sample Kurtosis" for the observations x1, x2, ..., xn.

$$\S = \frac{\hat{\mu}_3}{\hat{\sigma}^3} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^3}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^{3/2}} \tag{2}$$

$$K = \frac{\hat{\mu}_4}{\hat{\sigma}^4} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right)^2}$$

In equation 2,

§ is Sample Skewness

K is Sample Kurtosis

X bar is the average of the data

Then, Jarek's test statistic according to these two parameters is determined as follows:

$$JB = \frac{n}{6}\left(§^2 + \frac{1}{4}(K-3)^2\right) \quad (3)$$

If the data are derived from a statistical population that follows a normal distribution, the JB statistic will have a small value close to zero. The probability distribution associated with this statistic is asymptotically a Chi-Square distribution with 2 degrees of freedom. This characteristic enables the JB statistic to be utilized as a means of assessing the normality of a dataset.

3.2.2. The Dickey-Fuller Stationary test

The unit root test is employed to evaluate whether a time series is stationary (Dickey & Fuller, 1979). Stationarity means that the average, variance, and autocorrelation of the data stay consistent over time. The Dickey-Fuller test is a technique that employs a regression model to decide if a time series is stationary.

$$\Delta p_t = \mu + \lambda p_{t-1} + \sum_{i=1}^{n} \alpha_i (\Delta p_{t-1}) + \varepsilon_t \quad (4)$$

In equation 4,

Δp_t is the difference between the logarithm of the price of period t and the logarithm of the previous period t-1.

λ is the coefficients to be calculated .

N is times the autoregressive equation.

α_i is trend coefficient.

ε_t is error term.

According to studies by Kwiatkowski et al. (1992), Hamilton and Susmel (1994), Wooldridge (2010), and Enders (2015), the research hypothesis in the unit root test is as follows:

H_0: $\theta = 0$ Existence of single root and non-stationarity.

H_1: $\theta \neq 0$ The absence of a single root and the presence of stagnation.

If we accept hypothesis H_0, then we can infer that the data time series adheres to a walk pattern. This means that the time series being examined has one root and is considered unstable.

3.2.3. ARCH model

The majority of time series econometric tools are commonly employed to model conditional averages and random variables (Bollerslev et al., 1992; Engle, 2001). However, most economic theories are designed to address conditional variance or fluctuations in a process. Researchers have been driven to develop models that measure and forecast fluctuations in stock returns and market indices due to the study of financial market fluctuations. Over the years, several models have emerged to analyze the volatility of stock returns and price indices. In 1982, Engel introduced the Autoregressive Conditional Heteroscedasticity (ARCH) model, which aimed to model and predict fluctuations by describing variance as a self-process. However, most analytical time series models using ARCH require long time intervals and a significant number of estimated variables. To address the concern, a solution was found in the form of the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model.

Before 1982, linear processes were commonly used to model financial data, providing a suitable initial approximation. However, these linear processes often fail to capture the more complex and general structure of financial data. Financial data exhibit certain characteristics, such as:

1. The absence of linear correlation,

2. Time-varying fluctuations (instability changes over time),

3. A distribution with fat tails,

4. A significant level of correlation between the data's absolute value and square.

Linear processes did not adequately account for these aspects, leading to the development of various models to address such data characteristics. One of the most significant models introduced for such data is the ARCH model, originally used to model the logarithm of returns. ARCH models are useful for analyzing and predicting elements like exchange rates, inflation, and stock prices.

Traditionally, economists warned about the possibility of heterogeneity in variance in cross-sectional data and autocorrelation in time series data, and zero correlation was assumed in cross-sectional data and homogeneous variance in data of time series.

In any case, we can count other factors that cause autocorrelation in cross-sectional data:

1. As a result of periodic fluctuations in economic variables, it is possible that the sentences of disturbance follow a certain order.

2. Incorrectness of the mathematical form of the regression equations.

The fundamental theory of the ARCH model is that the variance at a given t is influenced by the square of the error term that was noticed in earlier periods (t-1). This dependence on the squared errors introduces a form of serial correlation. For instance, when the variance ε_t is only influenced by the squared error of one period before it, it is called an ARCH(1) process. If the variance is influenced by the error terms, from periods before it, it is called an ARCH(p) process.

3.2.4. ARCH(P) model

These models generalize ARCH(1) models for the error term. The main idea is to increase the order of the self-explanatory polynomial. In this scenario, the ARCH model is described in this manner:

$$\varepsilon_t^2 = c + \sum_{i=1}^{q} a_i \varepsilon_{t-1}^2 + u_t \qquad (5)$$
$$E(\varepsilon \perp \varepsilon_{t-1}) = 0$$

The conditional variance represented in equation 5 is defined as follows:

$$V(\varepsilon \perp \varepsilon_{t-1}) = c + \sum_{i=1}^{q} a_i \varepsilon_{t-1}^2 \qquad (6)$$

which depends on the previous one through the last values of q.

3.2.5. Portmanteau test

The Portmanteau test is a valuable method for evaluating the goodness of fit of a model in addition to graphical techniques (Escanciano and Lobato, 2009a & b). This test utilizes the autocorrelation of the residuals to examine the null hypothesis (H0: P1 = P2 = ... = PK = 0), where P represents the correlation coefficients at different lags of the residual series. The statistical measure employed is the modified Q statistic, or LBQ (Ljung-Box-Q statistic), which under the assumption that H_0's accuracy roughly conforms to a chi-square distribution.

$$Q = n \sum_{K-1}^{L} \gamma_K^2(\varepsilon_t) \qquad (7)$$

The modified Q-statistic is calculated using the formula provided, where n represents the number of data points, L is the maximum lag considered, and represents the correlation coefficients at the k^{th} lag of the residual series from the model. The model uses a notation to represent the estimated parameters quantity ε_t.

To interpret the results, if the calculated value of the Q-statistic exceeds the corresponding critical value from the chi-square table, the null hypothesis (H_0) is rejected, indicating a lack of goodness of fit for the model.

3.2.6. Wild bootstrap automatic variance ratio test (WBAVR)

The variance ratio test is commonly employed to evaluate the presence of serial correlation or predictability in financial time series data (Kim, 2006, 2009; Kim and Shamsuddin, 2008; and Kim et al., 2011). The test compares the observed variance of returns over different time horizons to the variance that would be expected under the assumption of a random walk. If the observed variance is significantly different from the expected variance, it suggests the presence of a serial correlation or predictability.

The wild bootstrap method is a reprocessing method that allows for valid inference when the underlying assumptions of classical parametric tests, such as normality or independence, are violated. It involves resampling the residuals of a regression model and incorporating them into the test statistic calculation to generate bootstrap samples. The wild bootstrap addresses potential issues with heteroscedasticity and autocorrelation in the residuals.

The automatic variance ratio test merges the variance ratio test with the wild bootstrap technique to address any violations of assumptions when dealing with autocorrelation and heteroscedasticity. (Chow and Denning, 1993: 207–208; Huang, 1995: 12–13; Chang and Ting, 2000: 11–12; Chen and Deo, 2006: 2463–2464; Benjellon and Squalli, 2008: 312–313; and Charles and Darné, 2009a–b: 5-6). Through resampling the residuals and generating bootstrap samples, this test offers analysis for determining if there is predictability in a time series.

By using the software SPSS 17, we analyze the Wild bootstrap automatic variance ratio test (WBAVR) for each index individually (BAX, DFMGI, FTFLKW, ISX60, MSX30, QSI, and TASI) of the Gulf countries (Bahrain, United Arab Emirates (UAE), Kuwait, Iraq, Oman, Qatar, and Saudi Arabia) as follows:

Table 0.2. Wild Bootstrap Automatic Variance Ratio Analysis for Gulf Stock Market Indices

(a) BAX Index

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-.816	-.033	.548	.148	-1.877	.148
	Efficiency	.228	.011	.139	.113	-.035	.511

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

(b) DFMGI Index

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-2.485	-.048	2.145	.271	-6.678	1.431
	Efficiency	.422	.016	.397	.315	-.354	1.234

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

(c) FTFLKW Index

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-1.651	.080	.896	.069	-3.461	.388
	Efficiency	.405	-.023	.193	.040	.057	.708

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

(d) ISX60

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-2.088	-.021	1.204	.100	-4.475	.254
	Efficiency	.316	.006	.210	.146	-.109	.751

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

(e) MSX30 Index

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-1.225	.049	.880	.173	-2.918	.550
	Efficiency	.151	-.010	.165	.381	-.168	.449

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

(f) QSI Index

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-1.454	-.221	.554	.007	-2.288	-1.055
	Efficiency	.306	.064	.137	.017	.059	.714

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

(g) TASI Index

Bootstrap for Coefficients

Model		B	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
1	(Constant)	-2.070	-.205	1.175	.013	-4.134	-.449
	Efficiency	.495	.056	.207	.002	.008	1.063

a. Unless otherwise noted, bootstrap results are based on 2000 wild bootstrap samples

Note: (a) WBAVR test result applied on the whole sample for the BAX index of Bahrain; (b) WBAVR test result applied on the whole sample for the DFMGI index of the United Arab Emirates; (c) WBAVR test result applied on the whole sample for the FTFLKW index of Kuwait; (d) WBAVR test result applied on the whole sample for the ISX60 index of Iraq; (e) WBAVR test result applied on the whole sample for the MSX30 index of Oman; (f) WBAVR test result applied on the whole sample for the QSI index of Qatar; (g) WBAVR test result applied on the whole sample for the TASI index of Saudi Arabia.

CHAPTER 4. EMPIRICAL RESULTS

4.1. INTRODUCTION

In this section, we will present the outcomes of this study about the efficiency of stock markets in Gulf countries. The initial step involves an analysis of the data of the seven stock market indices. This encompasses several statistical measurements such as the lowest and maximum values, standard deviation, skewness, kurtosis, and the Jarque Bera statistic. Furthermore, we will analyze the results of two statistical tests: the Augmented Dickey-Fuller test for unit root and the Lagrange Multiplier test for Autoregressive Conditional Heteroscedasticity, employing a lag length of 10.

Next, we proceed to discuss the findings from the Wild Bootstrap Automatic Variance Ratio (WBAVR) and AQ tests. These tests were conducted via a rolling sub-sample window approach to explore how market efficiency in Gulf countries changes over time. Our study focuses on examining potential variances in the efficiency of Gulf stock markets and investigating any shifts in market efficiency throughout our study period.

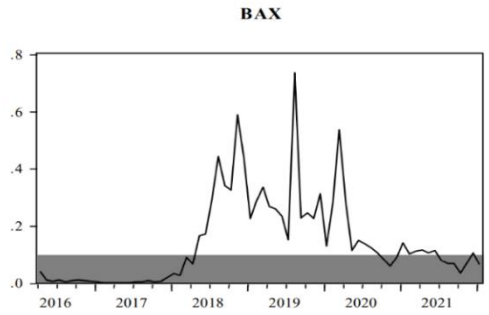
The outcomes of these tests offer insights into the efficiency of Gulf stock markets, which can have implications for both investors and policymakers in the region.

4.2. MAIN ANALYSIS RESULTS

In our study, we utilize the WBAVR test with a rolling sub-sample window approach. This method involves dividing the data into fixed-length windows and applying the WBAVR test to each window separately. The rolling sub-sample window approach allows for the examination of the time-varying predictability of returns and helps mitigate potential biases and changes in structure to time series. The researchers determined that a sub-sample window length of 30 monthly observations is sufficient for making statistical inferences. After applying the WBAVR test to the first window, the window is shifted one observation forward, and the test is repeated on the new window.

The preceding procedure is repeated until the entire sample period has been evaluated, and the probability (p) values for each window are calculated. The obtained p-values from the WBAVR test are then presented in Figure 4.1.

(a)



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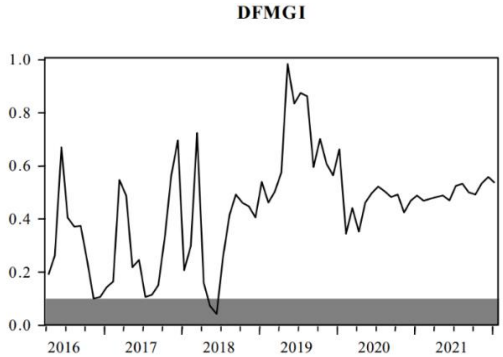

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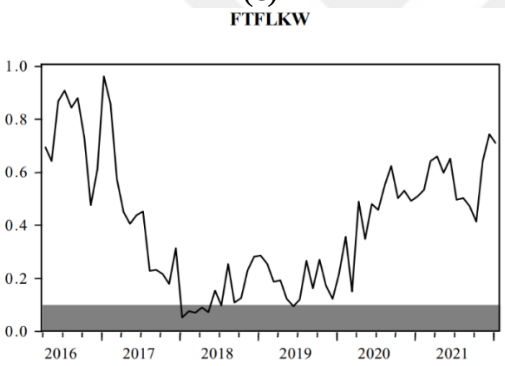

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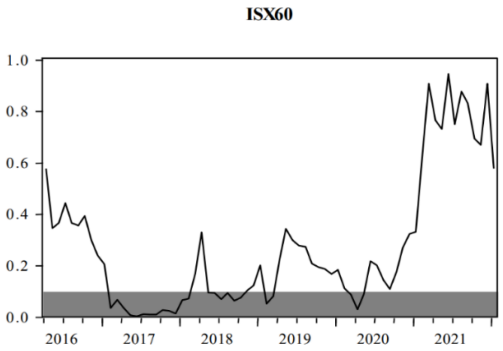

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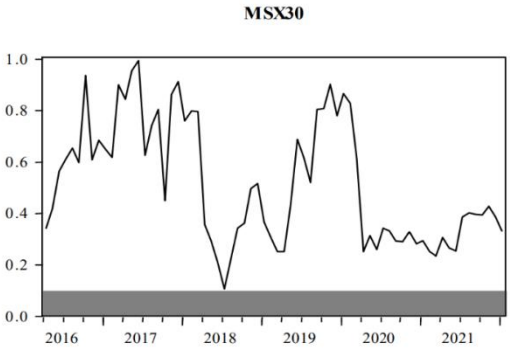

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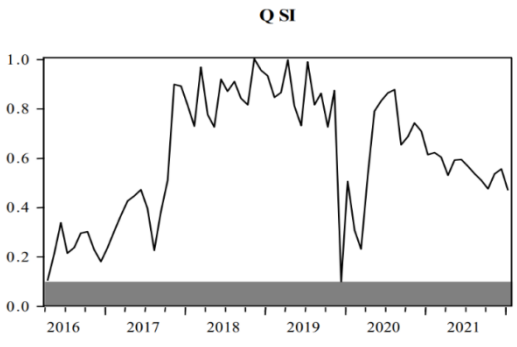

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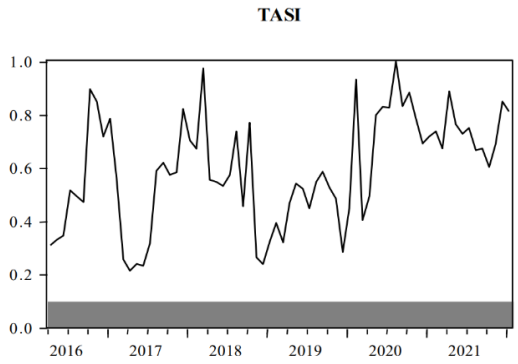


Figure 1 WBAVR test p-values

Notes: 1. (a) Calculated WBAVR test p-values via rolling sub-sample window approach for the BAX index of Bahrain; (b) Calculated WBAVR test p-values via rolling sub-sample window approach for the DFMGI index of the United Arab Emirates; (c) Calculated WBAVR test p-values via rolling sub-sample window approach for the FTFLKW index of Kuwait; (d) Calculated WBAVR test p-values via rolling sub-sample window approach for the ISX60 index of Iraq; (e) Calculated WBAVR test p-values via rolling sub-sample window approach for the MSX30 index of Oman; (f) Calculated WBAVR test p-values via rolling sub-sample window approach for the QSI index of Qatar; (g) Calculated WBAVR test p-values via rolling sub-sample window approach for the TASI index of Saudi Arabia.

2. The presence of the horizontal line denotes the significance threshold of 10%.

Based on the analysis of the studied data, it appears that different results are observed in the stock market across various indices. Based on the WBAVR test, the interpretation can be summarized as follows:

Figure 4.1(a) shows that the BAX index exhibited inefficiency from the beginning of the studied period until the middle of 2018. Table 3.2(a) indicates the inefficiency of this BAX market according to the significant value (Sig.) of 0.113 to appear greater than the level of significance (0.05), meaning this market is inefficient at the 95% confidence level as a result of several factors, encompassing:

The Bahraini economy faced lasting consequences due to the financial crisis in 2008, leading to a decrease in available funds and greater instability in the **BAX** index.

In 2016, the government of Bahrain undertook a series of reforms to improve the operational efficiency of the stock exchange. Nevertheless, the implementation of these

reforms required a considerable amount of time before their effects became evident. However, from that point until the end of 2020, there was a significant improvement in its efficiency. It is noteworthy that this period marked the index's best period of efficiency, with the highest level recorded in mid-2019. In 2020, the index's performance stagnated, and this inefficiency persisted across the whole time frame under consideration. The Bahraini economy was adversely affected by the oil price crash that occurred between 2014 and 2015, resulting in a subsequent decrease in liquidity and volatility within the **BAX** index. The aforementioned factors, along with the implementation of various policies by the Bahraini government in 2017 aimed at enhancing the efficiency of the stock market, were ascribed by the authors as the reasons for this outcome.

Table 3.1 further supports the tendency of increasing rates in this index, as indicated by the skewness value. The **BAX** chart confirms the presence of inefficiency in the first and last thirds of the studied period, aligning with the hypothesis that inefficiency cannot be rejected and is significant. Additionally, the hypothesis of predictability of variable returns during the years 2018 to 2020 suggests the existence of predictable patterns in the index's returns during that specific time frame, which exhibit time varying between 2018 and 2020 as a result of various factors, encompassing:

The Bahraini economy faced challenges due to the slowdown in the economy between 2018 and 2019. This downturn resulted in decreased availability of funds and higher instability in the **BAX** index.

The economic deceleration was further intensified by the COVID-19 pandemic in 2020, which also resulted in heightened instability within the **BAX** index.

In 2020, the government of Bahrain took many steps to improve the functioning efficiency of the stock market. However, the discernible effects of these reforms have yet to manifest substantially.

Table 3.2(b) indicates the inefficiency of this DFMGI market, according to the significance value (Sig.) of (0.315), which is greater than the study's significance level (0.05), meaning that this market is inefficient at a confidence level of (95%). However, based on

Figure 4.1(b), it can be interpreted that the DFMGI index has consistently maintained its efficiency throughout the reviewed period. However, a brief period of inefficiency and unpredictability was observed in the middle of 2018. Several factors, including the Dubai economy, experienced adverse effects as a result of the worldwide economic deceleration in 2018, resulting in reduced liquidity and increased volatility in the **DFMGI** index.

The Dubai economy experienced adverse effects as a result of the United States and China's trade dispute in 2018, which subsequently contributed to heightened instability in the **DFMGI** index.

In 2018, the Dubai administration implemented many initiatives to improve the operational efficiency of the stock market. However, the discernible effects of these reforms have not materialized to a substantial extent at present. Notably, the index reached its highest level of efficiency in the middle of 2019. Similar to the BAX index, the skewness rate is in Table 3.1 suggests a tendency for price increases in this index. Overall, this index does not reject the null hypothesis, is not significant, and emphasizes its predictability.

Table 3.2(c) indicates the efficiency of this market FTFLKW according to the significance value (Sig.) of (0.040) being less than the significance level of the study (0.05), meaning that this market is generally efficient at a confidence level of (95%), In simple words, considering the results collected from Figure 4.1(c), it can be concluded that the FTFLKW index has maintained its efficiency despite experiencing a period of relative stagnation in early 2018, similar to the DFMGI index. According to Figure 4.1, we can see the FTFLKW index has time-varying efficiency at the beginning of 2018. This stagnation persisted until the end of 2019. Towards the end of 2019, the index witnessed a notable recovery and approached its performance levels from the earlier years of the study, with its best performance recorded at the beginning of 2017. Additionally, the **FTFLKW** index demonstrates predictability, as the assumption of non-existence is not rejected and is not significant. Examining the kurtosis rate, the index experiences sharp increases and decreases at the onset and conclusion of the examined timeframe. Furthermore, the skewness rate indicates a tendency for skewness in this index. Based on the **FTTLKW** diagram, inefficiency can be seen in the beginning and middle of 2018 due to several factors, including:

The Kuwaiti economy experienced adverse effects as a result of the worldwide economic deceleration in 2018, resulting in reduced liquidity and increased volatility in the **FTFLKW** index.

The Kuwaiti economy experienced adverse effects and witnessed heightened volatility in the **FTFLKW** index as a result of the trade conflict involving the US and China in 2018.

In 2018, the Kuwaiti government took many steps to improve the operational efficiency of the stock market. However, the discernible outcomes of these reforms have thus far been limited in magnitude.

Based on the **ISX60** diagram (see Figure 4.1(d)), inefficiency can be seen approximately everywhere except at the beginning and end of the period.

According to the obtained results, it is evident that the **ISX60** index deviates from efficiency starting from the beginning of 2017 until the end of 2020. Table 3.2(d) indicates the inefficiency of this ISX60 market according to the significance value (Sig.) of 0.146, which is greater than the significance level of the study (0.05), meaning that this market is inefficient at a confidence level of 95%. Several factors contributed to this inefficiency, including:

The **ISX60** exhibits a relatively diminutive market size, positioning it among the smallest stock exchanges globally, as evidenced by its market capitalization of approximately $10 billion. This phenomenon renders investments more prone to fluctuations and poses challenges for investors in obtaining equitable valuations for their shares.

The **ISX60** exhibits a lower level of transparency compared to other stock exchanges, thereby posing challenges for investors in obtaining precise and reliable information about the listed companies on the exchange.

Government intervention: The Iraqi government exerts a substantial degree of control over the Iraqi Stock Exchange (**ISX60**), potentially resulting in the emergence of inequitable trading practices.

Due to the aforementioned factors, the ISX60 exhibited suboptimal efficiency within the specified timeframe. Investors engaging in trading activities on the ISX60 during this period faced an elevated susceptibility to financial losses. However, a significant crisis was observed at the beginning of 2021, indicating a considerable increase in efficiency during that year. The hypothesis of predictability and no deviation from efficiency is rejected for this index, which is significant and suggests that there are non-predictable patterns and deviations from efficiency present.

The ISX60 index experienced a notable surge in performance during the initial months of 2021. which monitors the financial performance of the 60 most prominent companies listed on the ISX60, experienced a significant increase of over 50% during the period spanning from January to November 2021.

Several factors contributed to the observed increase, which can be identified as follows:

The global economic recovery commenced in early 2021 following the COVID-19 pandemic, resulting in a surge in demand for Iraqi exports. Consequently, this development resulted in a crisis in the financial gains of Iraqi enterprises, thereby stimulating growth in the stock market.

The escalation of oil prices: The prices of oil experienced a significant surge during the initial months of 2021, thereby yielding advantageous outcomes for the Iraqi government, a prominent entity within the oil production sector. Consequently, this development resulted in a notable upsurge in investor confidence in the Iraqi economy, which led to an increase in the market exchange.

The enhancement of the security situation: The security conditions in Iraq witnessed a notable enhancement during the initial months of 2021, thereby instilling a greater sense of confidence among investors to engage in financial activities within the nation. Consequently, this development resulted in a notable surge in investment in the Iraqi stock market. The ISX60 index experienced a notable surge in performance during the initial months of 2021.

The **ISX60** index experienced a significant increase of over 50% during the period spanning from January to November 2021.

Several factors contributed to the observed increase, which can be identified as follows:

The global economic recovery commenced in early 2021 following the COVID-19 pandemic, resulting in a surge in the demand for Iraqi exports. Consequently, this development resulted in a crisis in the financial gains of Iraqi enterprises, thereby stimulating leads to an increase, in the financial market.

The escalation of oil prices: The prices of oil experienced a significant surge during the initial months of 2021, thereby yielding advantageous outcomes for the Iraqi government, a prominent entity within the oil production sector. Consequently, this development resulted in a notable upsurge in investor confidence in the Iraqi economy, thereby fostering a significant improvement in the stock market.

Improvements to the security situation: The security conditions in Iraq witnessed a notable enhancement during the initial months of 2021, thereby instilling a greater sense of confidence among investors to engage in financial activities within the nation. Consequently, this development resulted in a notable surge in investment within the Iraqi stock market.

Table 3.2(e) indicates the inefficiency of this **MSX30** market according to the significance value (Sig.) of (0.381), which is higher than the significance level of the study (0.05), meaning that this market is generally inefficient at a confidence level of 95%. The findings obtained from Figure 4.1(e) for the MSX30 index are quite clear, and we can see that this index does not have a time-varying efficiency, indicating that it has maintained its efficiency throughout the entire period under investigation. The non-significance and acceptance of the null hypothesis suggest that this index is reliable for forecasting purposes. It is crucial to acknowledge that, throughout the middle of the year 2018, this index exhibited a relatively weak performance. However, there was an improvement in its efficiency from that point onwards until the end of 2020. The MSX30 index experienced a decline in the year 2020. The index experienced its nadir in April 2020, exhibiting a decline to 3,383 points.

There was a decrease of 17.5% compared to the previous month. The decrease in the **MSX30** index can be attributed to various factors, such as the worldwide economic downturn resulting from the COVID-19 pandemic and the decline in oil prices.

Nevertheless, the **MSX30** index has subsequently experienced a rebound and is presently being traded at a level surpassing that of the previous year, 2020. The index experienced a notable surge in October 2021, reaching a value of 3,955 points. This figure represents a substantial growth of 17% compared to its previous low point observed in April 2020. The observed recovery serves as an indication that the Omani economy is commencing its recuperation process after the impact of the pandemic. Its greatest ability was observed during the first two years of the study, and this performance has declined in the last two years. Similar to the DFM index, this index exhibits negative skewness, indicating a tendency for price increases.

Table 3.2(f) indicates the efficiency of this market QSI according to the significance value (Sig.) of 0.017, which is less than the significance level of the study (0.05), meaning that this market is efficient at a certainty level of 95%. The observations from Figure 4.1(f) for the **QSI** index are indeed clear throughout the entire period under investigation. The index has consistently maintained its efficiency, and the acceptance of the null hypothesis further supports its reliability for prediction purposes. The efficiency of the index has shown a consistent upward trend since the beginning of 2017, except for a significant decrease in efficiency at the beginning of 2020. The global economy experienced a deceleration due to the COVID-19 pandemic, which necessitated the closure of businesses and the implementation of stay-at-home advisories for individuals. Consequently, there was a decline in consumption, resulting in a subsequent reduction in corporate profits. Consequently, investors exhibited an increased aversion to risk and proceeded to divest their stock holdings, thereby precipitating a decline in the **QSI** index. However, the index recovered and continued to exhibit increased efficiency thereafter. The null hypothesis has been accepted. (no significance), there is no doubt regarding the predictability of this index.

Table 3.2(g) indicates the efficiency of this TASI market according to the significance value (Sig.) of 0.002 being less than the significance level of the study (0.05), meaning that

this market is efficient at a confidence level of 95%. In Figure 4.1(g), successive fluctuations in its efficiency can be seen. This index has high efficiency but has suffered significant stagnation in 2017 and 2018. The **TASI** index experienced a decline in both 2017 and 2018. The index experienced its nadir in December 2018, exhibiting a decline to 7,174 points. There was a reduction of 40% observed from the highest point reached in January 2017. The decrease in the TASI index can be attributed to various factors, which encompass:

The global economic deceleration: The deceleration of the global economy in the years 2017 and 2018 was attributed to several factors, encompassing the trade tensions between the US and China as well as the negotiations surrounding Brexit. The deceleration in economic activity led to a decrease in purchases of merchandise and services, consequently leading to a reduction in corporate earnings. Consequently, investors exhibited an increased aversion to risk and proceeded to divest their stock holdings, thereby precipitating a decline in the **TASI** index.

The decline in oil prices has significant implications for Saudi Arabia, a prominent oil-producing nation, as it results in reduced revenue for the Saudi government from oil exports. The potential consequences of this phenomenon on the broader economy may be detrimental, potentially resulting in a decline in investor confidence. The Saudi Arabian economy experienced a substantial effect because of the fall in oil prices, which exceeded 50% during the years 2017 and 2018.

The economic reforms implemented by the government In 2017 and 2018, the Saudi government undertook a series of economic reforms to diminish the nation's reliance on oil. The implemented measures encompassed privatization initiatives, reductions in public expenditure, and the implementation of tax hikes. The aforementioned reforms encountered disfavor among certain investors, leading them to divest their stocks in anticipation of the anticipated adverse effects on the economy. In addition, the **TASI** index showed a decrease at the beginning of 2019 for the same previse reasons, and in December 2019, the COVID-19 pandemic led to a slowdown in the global economy, resulting in the closure of businesses and the enforcement of stay-at-home recommendations for individuals. As a result, there was a decrease in the overall demand for products and services, leading to a subsequent decline in

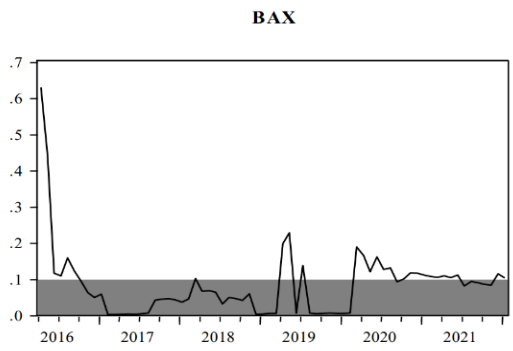
corporate profits. As a result, investors demonstrated a heightened reluctance towards risk and subsequently opted to divest their stock holdings, leading to a decline in the **TASI** index..

The index's acceptance of the null hypothesis indicates that there is no significant difference in efficiency in this index based on the TASI diagram, inefficiency cannot be seen anywhere.

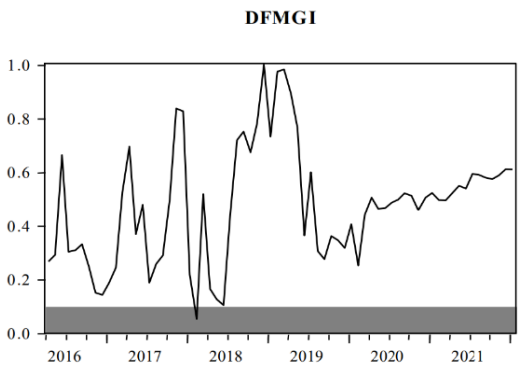
4.3. ROBUSTNESS ANALYSIS

To ensure the trustworthiness of this study's results, we conducted analyses using a test called portmanteau (AQ) proposed by Escanciano and Lobato (2009a). This particular test is highly suitable for examining predictability in returns. Is known to be robust against nonconditional heteroscedasticity, as emphasized by Lim et al. (2013). One important distinction between the AQ test and the WBAVR test lies in how they assign weights to sample autocorrelations. According to Charles et al. (2015a & b), the AQ test gives equal weight to all example autocorrelations up to the order, while the WBAVR test gives greater weight to lower sample autocorrelations. It's worth noting that significant differences were observed in the results obtained from the AQ test. These differences can be attributed to characteristics in the AQ test itself. A possible reason for this disparity could be a gap between the maximum number of data points analyzed in this study. Table 3.1 demonstrates the differences between these maximum values across various indicators. The range disparity in data can significantly influence the obtained results, leading to variations in the observed efficiency or inefficiency of indices.

(a)



(b)



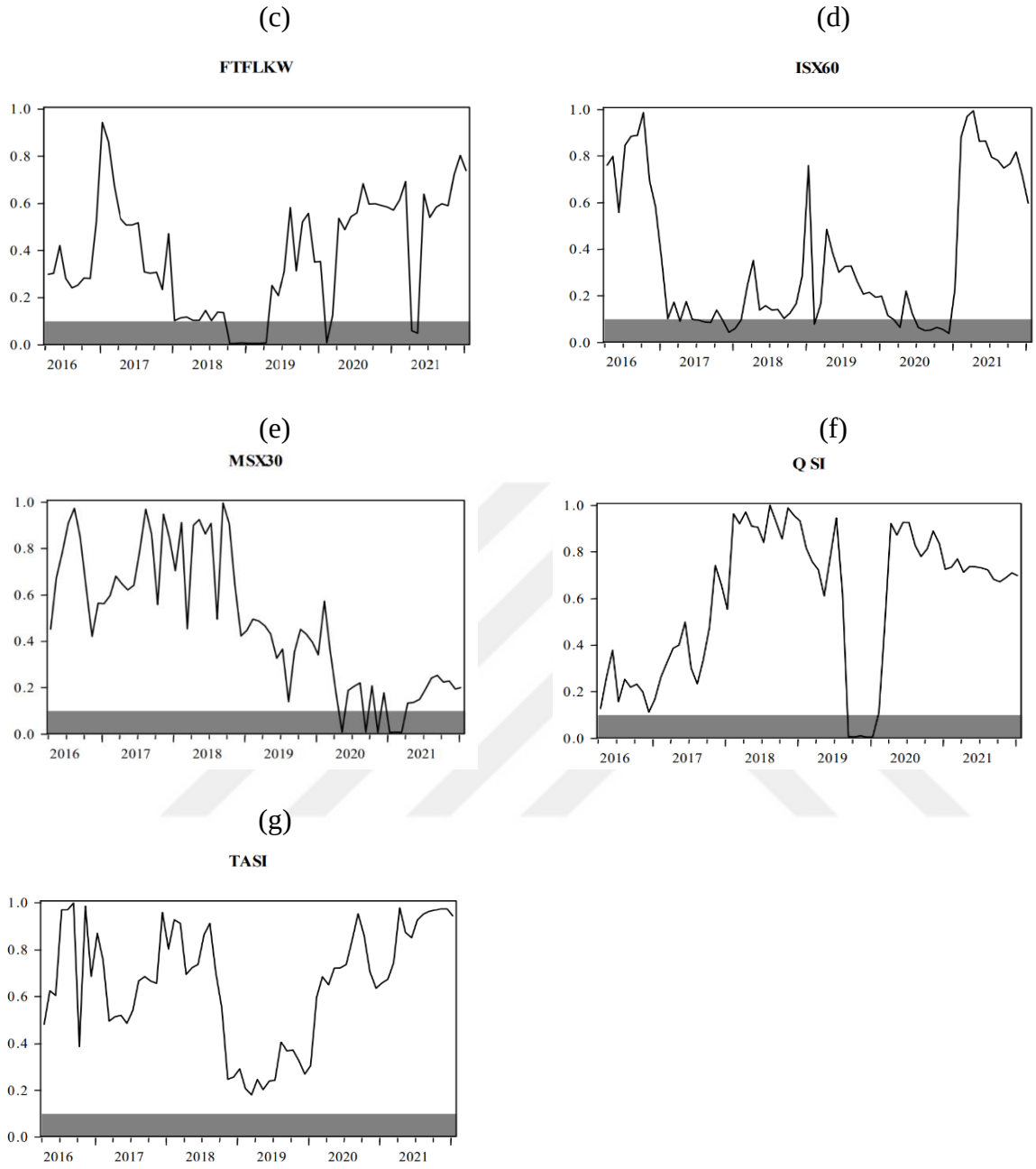


Figure 2 AQ test p-values

Notes: 1. (a) Calculated AQ test p-values via rolling sub-sample window approach for the BAX index of Bahrain; (b) Calculated AQ test p-values via rolling sub-sample window approach for the DFMGI index of the United Arab Emirates; (c) Calculated AQ test p-values via rolling sub-sample window approach for the FTFLKW index of Kuwait; (d) Calculated AQ test p-values via rolling sub-sample window approach for the ISX60 index of Iraq; (e) Calculated AQ test p-values via rolling sub-sample window approach for the MSX30 index of Oman; (f) Calculated AQ test p-values via rolling sub-sample window approach for the QSI index of Qatar; (g) Calculated AQ test p-values via rolling sub-sample window approach for the TASI index of Saudi Arabia.

2. The presence of the horizontal line denotes the significance threshold of 10%.

Figure 4.2 provides a representation of the p values from the AQ test for any index.

As observed in Figure 4.2, the obtained results in this test completely align with the findings from the WBAVR test. It's important to highlight that the null hypothesis has been rejected, which confirms that the BAX index was inefficient (see Figure 4.2(a)) throughout the study period. This test provides a level of certainty about this result. As described, the Wild Bootstrap Automatic Variance Ratio test assigns bigger weights to minimize sample autocorrelation, which differs from the AQ test. Based on the provided figure, it is evident that only two absolute maximum points, occurring in the middle of 2019 and early 2020, fall within the accepted area.

According to Figure 4.2(b), it is evident that in both tests, there was a temporary stagnation in the efficiency of the DFMGI index in early 2018, but this stagnation was quickly reversed with a sudden jump. This indicates a temporary interruption in efficiency, followed by a swift return to normalcy. Overall, the presence of time-varying, predictable market efficiency is evident in this indicator.

As observed in Figure 4.2(c), the FTFLKW index results obtained from the AQ test indicate a period of deviation from performance starting from the beginning of 2018 and continuing until the early months of 2019. This interval, although showing weak performance in the WBAVR test as well, is considered a local minimum interval in the AQ test when considering the entire studied period. This explains why this interval falls below the p-value line in the AQ test. Furthermore, there are two additional points at the period's end, namely the first quarter of 2020 and the middle of 2021, where a drop in efficiency can be observed. According to the WBAVR test, these points also correspond to local minimum areas. Overall, it can be acknowledged that the general results in both tests are consistent, taking into account the specific properties and characteristics of each test.

According to the ISX60 index results obtained from the AQ test (see Figure 4.2(d)), it can be observed that the period of deviation from efficiency started at the beginning of 2017

and extended until the early months of 2021. However, in the WBAVR test, there is an indication of efficiency growth in the early months of 2021. This discrepancy may be related to the distinctive features and characteristics of the AQ test. It is important to note that both tests emphasize the rejection of the null hypothesis, providing evidence for the deviation from efficiency in this index. This deviation is visible and supported by the results of both tests.

From the MSX30 index results obtained from the AQ test (see Figure 4.2(e)), it can be concluded that there is a deviation from efficiency in this index towards the end of the study duration, contrary to the results obtained from the WBAVR test. The stagnation in performance can be attributed to the fluctuations observed in the graph related to the WBAVR test. It is worth noting that at the end of the duration, there are intervals that include minimum values, although the WBAVR test assigns more weight to these intervals as minimum intervals. However, the QA test does not consider this specific feature, resulting in a difference in the results between the two tests.

The obtained results from the QSI index in the AQ test can be concluded to align completely with the findings of the WBAVR test (see Figure 4.2(f)). It is necessary to keep in mind that the null hypothesis was not rejected, indicating no significant deviation from the efficiency of this index. Based on the presented figure, it is evident that in both tests, there was a temporary period of stagnation in the efficiency of this index at the end of 2019. This interval of inefficiency is also visible in the WBAVR test figure. However, this lack of efficiency was quickly compensated by a visible jump at the beginning of 2020. The presence of predictable market efficiency that varies with time is fully evident in this indicator.

By combining the AQ test results (see Figure 4.2(g)) with the WBAVR test results, it is evident that their findings are entirely consistent; both tests provide evidence supporting the rejection of the null hypothesis. These results suggest that the behavior of the TASI index exhibits full efficiency. Although there is a significant decrease in the level of efficiency from 2018 to 2020, it cannot be proven that there is a deviation from efficiency in this index.

Upon examining the graphs in Figure 4.2, it becomes evident that the AQ test results corroborate the study's findings.

4.4. DISCUSSION OF THE FINDINGS

Based on our research, we have observed the efficiency of stock markets in the Gulf countries time-varying. Specifically, during periods in 2018, the stock markets of Bahrain, the United Arab Emirates, Kuwait, and Iraq showed deviations from market efficiency. This can be attributed to 2018 being one of the worst years for equities since 2008, with volatility caused by indications of a global economic downturn. We noticed concerns related to policy, political issues, inflation fears, and increased regulation in the technology sector. However, during the period, the stock markets of Oman, Qatar, and Saudi Arabia did not exhibit any deviations from market efficiency.

Moving on to times during the COVID-19 crisis and the commencement of its second wave in 2020, we found that all countries studied (except Saudi Arabia) experienced a deviation from market efficiency in their stock markets. Therefore, we conclude that during this period, Bahrain, the UAE, Kuwait, Iraq, Oman, and Qatar had fluctuations in their stock markets that varied over time.

Our study also discovered that the stock market in Saudi Arabia showed a lot of volatility. Following behind, the Qatar stock market exhibited the lowest level of fluctuation, while the UAE stock market ranked third in terms of stability. The stock market in Oman was found to be volatile. On the other hand, it was observed that the Bahrain stock market experienced a level of fluctuation. Additionally, the Iraq stock market was considered to have a level of volatility, with Kuwait being relatively less volatile compared to Bahrain and Iraq.

According to Ghalayini and Alkees (2019), the efficiency of stock markets in the GCC region is generally observed. There may be occasions when the efficiency of a system fluctuates as a result of variables such as instability, economic shocks, and changes in market laws. Butler and Malaikah (1992) assert that the Kuwaiti stock market demonstrates operational efficiency in its structure. In contrast, Al-Zubaidi and Al-Kaabi (2021) discovered that the Iraqi stock market exhibits deficiencies in terms of efficiency. Moreover, according to Al-Hatem et al. (2020), the stock markets of Kuwait and Saudi Arabia exhibit efficiency in their respective forms. According to Asiri's research conducted in 2008, it was found that the stock markets of Saudi Arabia and the United Arab Emirates demonstrate efficiency in their

respective forms. Moreover, in his study, Al-Jafari (2011) found evidence suggesting that the stock markets of Bahrain and Oman have efficient operational characteristics. Asiri and Alzeera (2013) discovered empirical evidence of market efficiency in the stock markets of Kuwait and Qatar. The study conducted by Squallis in 2006 demonstrated that the stock markets of the Gulf Cooperation Council (GCC) display efficiency in their overall shape. Charfeddine and Khediri (2016) concluded that the stock markets in the Gulf Cooperation Council (GCC) region are usually defined by efficiency. However, they also noted that these markets might undergo periods of fluctuating efficiency as a result of variables such as instability, economic shocks, or changes in market laws. Overall, our research findings indicate that the level of stock market efficiency in Gulf countries is time-varying. This discovery emphasizes the need to keep tabs on market efficiency and factor in its dynamic nature when making investment choices or crafting regulatory policies. This finding may have important ramifications for Gulf investors and policymakers, and further study could investigate the causes of the markets' temporal variability.

CONCLUSION

This research focuses on analyzing the time-varying efficiency of stock markets in seven Gulf countries: Bahrain, the UAE, Kuwait, Iraq, Oman, Qatar, and Saudi Arabia. To assess market efficiency, two tests are conducted: the wild bootstrap variance ratio test and the automatic portmanteau test.

The results indicate that the stock markets in Bahrain, the United Arab Emirates, Kuwait, and Iraq exhibit varying degrees of efficiency over time. This means that they are not consistently efficient but experience periods of both efficiency and inefficiency. On the other hand, the stock markets of Oman, Qatar, and Saudi Arabia are found to be market-efficient during the study period and are consistently efficient. These findings were supported by both the bootstrap variance ratio test and the automatic portmanteau test.

The study suggests that investors have an increasing opportunity to predict stock prices and earn returns in the stock markets of Bahrain, the United Arab Emirates, Kuwait, and Iraq. This is due to their inefficiency, which creates the potential for profiting from mispricing.

Additionally, this research emphasizes the importance of considering the nature of stock market efficiency when making investment decisions. Investors should not assume that all markets are always efficient; they need to be aware of periods when inefficiency is more likely.

It's important to note one limitation of this study: the study has some limitations regarding the data. We collect data from seven stock market indexes in the Gulf countries. There might be some limitations in terms of quality and accuracy. It's possible that the absence or insufficient number of data points could have an impact on our investigation's results.

However, it's important to note that this study still offers insights into how the efficiency of stock markets in seven Gulf countries is time-varying. Investors and

policymakers can utilize these findings to make investment decisions and establish effective regulations.

During several periods of the study, we discovered that the stock markets of Bahrain, the United Arab Emirates, Kuwait, and Iraq had time-varying efficiency. This means that stock prices in these markets do not always fully reflect all available information, and investors may be able to achieve extraordinary profits by trading on historical price movements.

Comparison of Studies

Ghalayini and Alkees (2019) suggest that the stock markets in the GCC region are generally efficient. There might be instances when their efficiency varies due to factors like instability, economic shocks, and alterations in market regulations. According to Butler and Malaikah (1992), the Kuwaiti stock market operates efficiently in its current form. On the other hand, Al-Zubaidi and Al-Kaabi (2021) found that the Iraqi stock market lacks efficiency. Additionally, Al-Hatem et al. (2020) revealed that both Kuwait's and Saudi Arabia's stock markets demonstrate efficiency in this regard. Asiris's research in 2008 also indicated that the stock markets of Saudi Arabia and the UAE exhibit efficiency in this form. Furthermore, Al-Jafari (2011) discovered that Bahrain and Oman's stock markets operate efficiently in this form. In this vein, Asiri and Alzeera (2013) found evidence of efficiency in Kuwait and Qatar's stock markets. Squalli's study in 2006 revealed that overall, GCC stock markets exhibit efficiency within the form. However, Charfeddine and Khediri (2016) concluded that GCC stock markets are generally efficient but can experience periods of varying efficiency due to factors such as instability, economic shocks, or changes in market regulations.

Agree opinions:

According to findings from studies conducted by Squalli (2006), Asiri (2008), Al-Jafari (2011), Asiri and Alzeera (2013), Charfeddine and Khediri (2016), Ghalayini and Alkees (2019), and Al-Hatem et al. (2020), the GCC markets are generally efficient. Nevertheless, there may be instances of time-varying performance. On the other hand, Butler

and Malaikah (1992), Squalli (2006), Asiri (2008), Al-Jafari (2011), Al Ashikh (2012), Asiri and Alzeera (2013), and Al-Zubaidi and Al-Kaabi (2021) suggest the current state of the Kuwaiti stock market is inefficient.

Difference opinions:

The results obtained in our study are incongruent with the outcomes provided in the investigations conducted by Hassan et al. (2003), Moustafa (2004), Asaad (2014), Asaad et al. (2015), Awan and Subayyal (2016), Hamid et al. (2017), Hawaldar et al. (2017), Khudair and Al Rubaie (2017), Olubiyi and Olopade (2018), and AL-Shakurji and Chaqmaqchi (2019), are some of the authors mentioned. Broadly speaking, similarly, Al-Hatem et al. (2020) contend that the current structure of the Saudi stock market is inefficient. Our findings are consistent with existing research that investigates the efficiency of stock markets, both in the Gulf area and globally. The available information indicates that there are instances in which stock markets exhibit efficiency. There are also occasions in which their efficiency may be compromised as a result of factors such as instability, economic shocks, and alterations in market laws.

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