Stock Exchanges in the Middle East: Risky Business or Smart Investing?

The Honors Program
Senior Capstone Project
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ABSTRACT

The goal of any investor is to obtain the highest possible return for his or her money. However for years, the debate has continued; stocks, bonds, mutual funds; which of these financial instruments will produce the greatest gain to give the investor the highest profit? Historically, stocks have been known to provide investors with high returns. With the world becoming increasingly globalized, international markets have proven to offer investors more options to help diversify their portfolios. The Middle East has been known as a region of recent economic growth and stability. Three prominent examples of such are Kuwait, Israel, and Jordan. With GDP growth steadily rising and purchasing power in the hundreds of billions, the Middle East has been seen as a region of growing economic stability and rapid development. For example, Egypt alone has grown by almost 7.2% in 2008, ranking among the fastest growing GDPs in the world; according to data gathered by the World Bank. Jordan also ranked high growing by over 7% in GDP each year since 2006 until 2009 (World Bank, 2011). Although these countries may not be in the list of top ten fastest growing economies, they still have shown recent leaps in overall economic stability and growth in comparison to years prior. Economists have speculated that financial stability and infrastructure follow a growing economy. With the rapid economic growth of such countries as Kuwait, Jordan, and Israel, it is only logical that investment opportunities present themselves. Although this is a logical conclusion, much research on the stock exchange of these countries is somewhat limited. These stock exchanges have the potential to give any investor the diversification he or she desires as well as a similar, if not a higher return than those of England, Japan, and the United States due to the similar coefficients of variation. The coefficient of variation, defined as the degree of variation from one series of data to another, can give an investor a more accurate idea of how much risk is assumed per unit of return. This calculated statistic is a more accurate indicator than return or standard deviation alone because it places the degree of variation in context to the data. In investment terms, the coefficient of variation measures how much risk is being assumed by the investor in relation to how much return he or she can possibly receive. The coefficient of variation for the Israeli, Jordanian, and Kuwaiti stock exchanges will allow them to rival the competitiveness of stock exchanges that are more well known.

INTRODUCTION

The Gulf War in 1990 which lasted until 1991, the constant Arab-Israeli conflicts that have dated back to 1947, the US "War on Terrorism" which began in Afghanistan in 2001 and then continued with the invasion of Iraq in 2003, and just recently the conflict with Iran over the possession of nuclear-warfare capabilities; all of these listed events are only a small, current glimpse into the constant conflict seen in the Middle East. With such political turmoil, economic vulnerability, and controversial foreign relations tactics, the region is often overlooked as a plausible emerging market for companies to expand. Investors themselves have also shied away from the Middle East as a region of possible investments due to these same reasons. However, with the increase in risk comes the directly correlated and equal if not greater possibility for return. The recent economic growth in the Middle Eastern countries shows significant room for investor potential. It is the belief of some that due to increased economic activity and growth the financial infrastructure will follow immediately, signaling an emerging market for investment. The Middle East has shown significant growth economically and has technologically risen to enter the 21st century in recent years. For investors, emerging markets and "hidden treasures" that are new companies are a gold mine. With new companies with few investors, individuals can make higher returns; but will have to deal with greater risks. Stock exchanges that are newer, less frequently invested in, and are surrounded by an environment that is growing. Such a scenario allows investors to discover a hidden gem and gain some higher returns on their capital than they would investing in stock exchange that have historically been highly saturated with investors; such as the New York Stock Exchange (NYSE), the London Stock Exchange (LSE), the Frankfurt Stock Exchange (FSE), and the Tokyo Stock Exchange (TSE). This thesis will aim to prove just this! With the evaluation of the coefficients of variation of the top stocks with the highest market capitalization in the Amman Stock Exchange (ASE), the Tel Aviv Stock Exchange (TASE), and the Kuwaiti Stock Exchange (KSE); patterns will be identified that will conclude what in fact affects the coefficient of variation (CV) of a stock, as well as whether these stocks are viable options for investors.

LITERATURE REVIEW

Stock Exchanges in the Middle East (Kuwait, Jordan, Israel)

Although sufficient research has been conducted surrounding the history of Middle Eastern stock exchanges, mainly those in Kuwait, Jordan, and Israel, the focus of the studies have been concerning two aspects; history and advancement of the exchanges, and their outlook or forecasted performance. Keith K.H. Park and Antoine W. Van Agtmael summarized the world's most promising stock exchanges for the future in The World's Emerging Stock Markets (1993). Park and Agtmael detail the history of many of the stock exchanges around the world, focusing on the Amman Financial Market (AFM), located in Jordan, for the Middle Eastern region. This source details the history of the exchange, regulations surrounding investment in the exchange, as well as developmental and growth obstacles. From the span of ten years (1980-1990), the AFM has grown from fifty-seven to one hundred and eight companies (Park & Agtmael, 1993). Park and Agtmael also focus on many emerging markets around the world, including countries such as Sri Lanka, Mexico, and Turkey. Turkey, considered both a Middle Eastern and European nation, was not included in this study. Although the Middle East may not be as advanced or as promising as these exchanges, the only country to be examined in this source is Jordan. This source, published in 1993, has not been updated since. This is a concern and can reduce its applicability and validity today. With the lack of current news concerning the Middle East, one investigates whether the Middle East has seen more growth in its financial sector, focusing on such areas as the stock exchanges. In fact, much of the Middle East's growth has been in recent years. Therefore, while Park and Agtmael may have validly discovered the value of the AFM up until 1993, much newer, up-and-coming markets such as that of Kuwait and Israel have not yet been publicized. It is in fact this lack in material on these three countries, despite their recent economic growth and stability, which signals a "hidden treasure" for investors and financial moguls. Other sources, such as B. Mark Smith's *The Equity Culture*, state: "During the 1980's, the free-market ideas that had gained ascendancy in London and Washington spread to the developing countries of East Asia and Latin America". Without even a mention as to the history or market within the Middle East, many countries such as Jordan, Kuwait, and Israel are left out of context, although they have been involved in stock trading well before the

1980's. The lack of published ideas and theories on the Middle Eastern financial infrastructure leaves a gap in the financial world's timeline.

Other sources do go further to mention the history and existence of stock exchanges like the Kuwaiti stock exchange; although briefly. Since the 1950s, it has been cited; however Elfakhani, Arayssi, and Smahta go further to examine the statistical history of these exchanges; taking into account such factors as market capitalization, inception, and companies listed on the exchanges. However important this information, it is still basic and does not give the investor an idea of the real movement of these markets. This source also serves to examine Middle Eastern stock exchanges that "co-integrate" with the New York Stock Exchange (NYSE). Put simply, *Globalization and Investment Opportunities: A Cointegration Study of Arab, U.S., and Emerging Stock Markets*, a portion of The Financial Review of 2008, published by the Eastern Finance Association (EFA), is a source that examines the relationship between the NYSE and these Middle Eastern stock exchanges. According to this study, Jordan and Kuwait are both relatively co-integrated with the NYSE. This is important because co-integration signals an alternative investment that yields similar returns as the NYSE. However, this study only covers the time-span of 1997-2002. In addition, this study aims to examine the co-integration of multiples Middle Eastern countries to the NYSE based on P-values, after examining returns for these years (Elfakhani, Arayssi, & Smahta, 2008). For this reason, Kuwait and Jordan have been two countries selected for this thesis. Their co-integration with the NYSE during the years leading up to 2002 shows stability, but the years afterwards are more applicable to today's investors. The outlying country, Israel, has been selected for its close ties to the US politically and for its economic premiership within the Middle East. Although a non-arab country, Israel is still a focal point of the Middle East and has been a leader in bringing the region into the 21st century.

Other journalists such as Heather Timmons look towards the real means of establishing a legitimate stock market in the Middle East. In an article titled *The Wall Street of the Mideast?*, she identifies the Dubai Stock Exchange as the new "Wall Street" of the Middle East. With its new establishment and re-vamped structure, Timmons believes that it could equate to New York's claim-to-fame of Wall Street (Timmons, 2003). Articles such as this inspire hope in the Middle Eastern stock markets and their future in the investment world.

Although the Dubai stock exchange is an important player in the financial arena, it recently was re-vamped, causing a severe lack in information that can be retrieved. This lack of sufficient and accurate information prevented it from being a part of this thesis. Despite the lack of data, Dubai and the U.A.E. in general have been making headlines in recent years due to economic growth, large foreign investments, and the tourism industry booming. All of these are healthy signs of a growing economy. Growing economies do operate hand-in-hand and correlate with financial stability and infrastructure.

Economic Growth

Economic growth is an important factor in this thesis. Economic growth is the catalyst for the emergence of successful stock exchanges and financial markets in any country. One follows the other. In a study conducted by Mohsen Mehrara, he examines the relationship between energy consumption and GDP within the Middle Eastern countries of Kuwait, Iran, and Saudi Arabia. Although this relationship was established to be that GDP drives energy consumption, and not the inverse, it does cite the increase in GDP in recent years (dating until 2002). Studies such as this conducted by Mr. Mehrara prove that an economic interest has been seen in the Middle Eastern region; an interest that will not only invest large corporations, but foreign direct investment, investors, and other business moguls. Yet another author aims to research and detail the economic, financial, and political struggles of Kuwait and from there, predict upon its outlook. Although somewhat dated, this book offers valuable insight into the history and background of the economic and financial environment of Kuwait, as well as offers some insight into the future of its financial health (Al-Yahya, 1993). Al-Yahya does cite that Kuwait shows promise for a bright future. Kuwait has emerged as a country of financial strength; with GDP per capita always topping the lists, Kuwait is home to many banks and financial institutions.

Based on a report by the Global Finance Report focusing on Emerging Economies, the Middle East has been a source of interest due to increasing economic health. Although banks both externally of the Middle East as well as internally within the region are reluctant to lend, debt issuance has made strides to help fund the region and pick up some of the debt due to loan reluctance. This report highlights the Middle Eastern banking systems as well as their plan to create a friendly environment for lending. This article in the Global Finance Report also cites

the Middle Eastern dependence on oil as a major driver behind the economic stability (Platt, 2009). Reports such as these are great to evaluate the validity of the economic environment of the Middle East, taking into consideration those countries being assessed; Kuwait, Jordan, and Israel. However, with oil being such a scarce resource and the constant research being put into alternative energies, oil as a driving economic factor may not aid the Middle East in its quest for financial independence and stability. Other reports such as the Global Finance Annual Survey of May 2009 highlights the National Bank of Kuwait as well as the Arab Bank of Jordan and how they are some of the most influential and prosperous banks in the region. Such articles instill investor confidence in the region and often times, confidence is the most influential factor in investment decisions.

Other economists write about the economic strategies of various countries in the Middle East. One journal article in the Applied Economics Letters journal of 2004 highlights the country of Jordan and its strategy of boosting its economy by increasing exports. Empirically, this study aims to prove that there is a direct correlation between the increase in exports and the improvement of the economy. Through growing the economy by increasing exporting, more foreign investment is being encouraged (Abual-Foul, 2004). Such a study provides more evidence that Jordan's economy has been growing. It offers some reasoning as to why countries such as Jordan have experienced recent growth. Although dated, this source examines Jordan's economy from 1976-1997. Event though this thesis aims to prove that the economic boom precedes the financial infrastructure, such articles detailing the reasons behind the economic growth also help to explain what portions of the economy will positively or negatively effect the coefficient of variation (CV) used in the thesis model. Another author reveals the strategy of using the Technology Industry as a means of boosting economic growth. By having the Israeli government adjust its policy to allow for more technological advances, as well as having the technology sector in the country grow, the economy has benefited. It has benefited greatly that in the midst of the economic slowdown in recent years, there is a rising concern as to whether this technological boom can cushion Israel from the economic downturn; or whether Israel will suffer like most other countries in the world (Berry & Grayeff, 2009).

One interesting article found in *Women's Wear Daily* attributes the economic growth of the Middle East as a factor in the growth of the luxury goods industry. Katya Foreman cites that with the economy growing in recent years, even in the midst of the recent economic recession, retailers of luxury goods, such as Louis Vuitton, Gucci, and Cartier have moved to expanding in the Middle East (Foreman, 2010). Not only does this show evidence of a growing economy in the MENA (Middle East and North Africa) region that not only is attracting business expansion; but it also signals consumer confidence in the region due to economic growth.

As is being assumed and implied in this study, such indicators as interest rates, inflation rates, GDP per capita, and other commonly held economic statistics are being used as key components to economic growth. Based on research and economic experience, the most well known statistics that are also population sensitive and are often closely watched by economists and the public alike are being used as the basis of the equation used in the regression involving the coefficients of variation. Since these economic indicators are seen as vital to the economy, it will be studied and concluded as to how they affect a coefficient of variation.

Infrastructure

The Financial Infrastructure is also an aspect of the thesis that must survive the economic growth. Although more general, one source discovered in researching the Middle East and North Africa (MENA) region is one that discusses infrastructure within the region. A commonly overlooked subject, this journal article aims to illustrate the status of the infrastructural demands of such booming economies as those in the MENA region (Stretched at both ends, 2008). The article highlights the need for financing for infrastructure projects that are necessary to accommodate the growing populations of the MENA economies. Such signs of growth show the increase and need for infrastructure. Yet other studies examine the effects of stock exchanges in certain countries and their effects on the economic growth of the country. One study by Khalid A. Alkhathlan shows such a relationship between certain variables, one of which being the stock market, and its effect on overall GDP. Although this study shows an increase in the value of the stock exchange over the years, it does also show that the stock market in Saudi Arabia does not have much of an effect on the overall GDP of

the country (Alkhathlan, 2009). However, if taken in reciprocal form, although the stock exchange might not have affected the overall GDP, the inverse could very well be true. It is unsure but likely that the GDP would have directly helped the stock exchange. As the economy of Saudi Arabia grew over the years, simultaneously, the stock market of Saudi Arabia did increase exponentially. This study conducted in Riyadh, Saudi Arabia, does not prove evidence that the financial sector has a significant effect on the growth of an economy, but does offer a gap of information that can be tested.

Market Analyses

Overall, the outside world does affect investments. As many financial professionals know, confidence is the primary driver behind investments. Confidence is necessary for an investor to put his or her capital at risk. Such research as the book World Event Trading by Andrew Busch gives insight into another type of investing that is greatly affected by world events and the confidence that correlates to them. Andrew examines how a trader can manage to make money based on trading that involves using major headlines from current media sources as indicators of which industries, countries, and companies show growth potential and can be expected to fluctuate. Busch cites such events as the months leading up to Bill Clinton's impeachment and Gingrich's many headlines. Busch take a two-pronged attach using this book. First he examines how headlines have impacted the markets by looking at both the world events and headlines and then by examining the market's reaction during that time period. Second, he analyzes how such information can be used in the future to predict market movement, and therefore make money in the stock market. He examines all world events, from terrorism, to political party changes in Washington, to earthquakes abroad. Such analyses are beneficial because they allow any investor to understand the relationship between information presented by the media, and the sensitivity of the market. This is also important, because it signals the sensitivity of investors. Although a smart investment is discovered, one negative headline could jeopardize whether that investment is made. Negative information is more powerful than positive information in Wall Street.

Coefficient of Variation & Market Capitalization

Coefficients of Variation and Market Capitalization are two major factors of the thesis being presented. The stocks being chosen are based on the highest market capitalization. Likewise,

the comparison exchanges (NYSE, LSE, TSE, and FSE) were all chosen due to their representation of the highest market capitalizations in the world. Based on a study conducted by two researchers at the University of Chicago, Andrew W. Lo and Jiang Wang, much research has been done on the subject of price behavior within the stock market, but less attention has been paid to the behavior of trading volumes. "On the theoretical side, the role of market capitalization in explaining volume is related to Merton's (1987) model of capital market equilibrium in which investors hold only the assets they are familiar with. This implies that larger-capitalization companies tend to have more diverse ownership, which can lead to more active trading" (Lo & Wang, 2001). This can help any investor realize that companies with the highest stock market capitalization will have the largest trading volumes, in theory, thereby signaling the highest possible growth opportunities. Higher trading volumes, according to Lo and Wang's research, generally provide more growth and higher returns. Therefore, transitively, higher market capitalization means higher trading volumes, which in turn means higher returns on average. Similarly, according to Avner Kalay, Li Wei, and Avi Wohl's article in the 2002 Journal of Finance Volume 1, higher trading volumes, in theory, is a result of higher trading frequencies of equities. This is precisely why stocks and exchanges with the highest market capitalization are being examined in this study. By comparing stocks and stock exchanges with relatively similar high market capitalization and high trading volumes, data will be more accurate.

Beta, alpha, and return are all statistics and indicators of the performance or risk of a stock. However, coefficient of variation is a statistic that combines the best of worlds, return and risk. As has been a commonly held principle, the lower a coefficient of variation, the lower the risk-return tradeoff. On the basis of the study by Choudhury and Naidu, this principle is reinforced by stating that the coefficient of variation gives any investor a better indication of how much risk is being taken per unit of return (Choudhury & Naidu, 2009). Historically, studies have been using the coefficient of variation as a standard measure of risk-return tradeoff. Even as far back as the Journal of Finance in 1970, Charles DeWitt Roberts and Edna N. Roberts were using the coefficient of variation as a measure of risk. Since it was discovered years ago that returns alone cannot be used as a measure of future returns, risk had to be factored in. The amount of return per unit of risk is the Sharpe ratio; and the inverse is

the coefficient of variation. Roberts and Roberts discovered as far back as 1970 that the coefficient of variation and the Sharpe ratio were important because they gave an investor a means of evaluating an investment by not only including return, which is subjective, but by evaluating return when expressed as a unit of risk. By identifying return as a unit of risk, according to Roberts and Roberts, an investor can evaluate how much he or she stands to gain per unit of loss, and vice-versa, rather than merely examine how much can be gained. Introducing the Sharpe Ratio and Coefficient of Variation, finance professionals were able to look at both ends of an investment, rather than a one-sided view based on returns. It is for this reason that coefficient of variation is being examined as the focal measurement between the stock exchanges of Kuwait, Israel, and Jordan, against the likes of the US, Japan, Germany, and the UK.

HYPOTHESIS

As a result of the afore mentioned research, it is apparent that not only has sufficient interest been shown in the stock exchanges of the Middle East, but analysts and economists have gone so far as to analyze their movement in relation to that of the NYSE. Yet, despite all of the research and publications, much research has not been conducted pertaining to certain aspects of Middle Eastern stock exchanges. There still is yet to be a definitive conclusion as to whether the stock exchanges of three of these Middle Eastern "emerging" exchanges will offer a similar if not better return as that of the New York Stock Exchange (NYSE), and similar advanced exchanges, such as the Japanese Stock Exchange (JSE) and the London Stock Exchange (LSE). Coefficient of variation, although a commonly held financial principle, has yet to be applied to the exchanges of Israel, Jordan, and Kuwait. In fact, little is known and reported concerning these three countries. In researching the economic growth of these countries and its correlation to the financial infrastructure of the stock exchanges, no analysis has been done to detail the effect of the economic factors on the coefficient of variation. Such factors as GDP per capita, Inflation rate, and Interest rate, are all factors that affect the economies of countries; yet no effort has been made to test their sensitivity against the performance of the respective stock exchanges of these countries. Due to these circumstances, this study will collect the data necessary to analyze the coefficients of variation for ten stocks in the Jordanian, Israeli, and Kuwaiti stock exchanges; and with this

data, analyze its correlation to that of the New York Stock Exchange, the London Stock Exchange, the Frankfurt Stock Exchange, and the Amman Stock Exchange.

The hypothesis in this testing is as follows: Although the Middle East has been a region of instability, war, and political turmoil; the economic development and stability of some countries in the region display signs of financial growth and sustainability. Since the development and often surging growth of the financial markets follow economic growth; the stock exchanges of Jordan, Israel, and Kuwait will display a coefficient of variation similar to that of more developed countries such as the United States, Germany, the United Kingdom, and Japan.

NOTE: The coefficient of variation is defined by the formula, standard deviation divided by return. This equation results in a number in percentage form which represents the degree of variation from one series of data to another.

METHODOLOGY

This study will use the historical prices of the top ten stocks within each of the stock exchanges being examined (Kuwait, Jordan, Israel, England, Japan, Germany and the United States) in order to calculate the monthly returns. Then the standard deviations will be calculated; and afterwards the coefficients of variation. The stocks that are being chosen are from various companies in different regions, sectors, and industries within each country. However, they all have in common the way in which they were selected. In order to establish a uniform selection process for choosing these stocks, the top ten stocks in each country's exchange will be chosen based on market capitalization. The ten stocks with the largest market capitalization will be chosen from every stock exchange being analyzed. Similarly, the comparative "established" stock exchanges (Germany, US, UK, and Japan) have some of the highest market capitalizations in the world and are recognized as being ranked in the top ten stock exchanges in the world according to Reuters (World's largest stock exchanges, 2007). After calculating and compiling the monthly returns of these equities, along with standard deviations, and finally coefficients of variation, a T-Test will be run for each of these stocks' coefficients of variation. The purpose of the T-Test is to illustrate the difference between the mean coefficients of variation of all the companies' stocks.

However, judging a country's investment climate is not possible by analyzing the coefficient of variation alone, even if a T-Test is utilized. In order to add another dimension to this project, the study will include calculating a regression analysis for the three Middle Eastern countries being analyzed in comparison to that of the US, England, Germany, and Japan. In order to set the formula for the regression analysis, certain factors will be considered pertaining to the country's financial and economic environment. With this regression analysis, these certain factors will be tested to see if they have an impact on the overall coefficient of variation of that country, and if so, how much of an impact each variable has on the coefficient of variation.

The factors being used to input into the regression analysis are: real GDP growth rate per capita, GDP per capita, inflation rate, interest rate, default-risk rate, number of companies listed in stock exchange being analyzed, overall value of stock exchange, investment percentage of GDP, stock exchange turnover rate, rule of law, and type of government. All of the data for these factors for each country will be compiled into a spreadsheet. After this is done for all of the countries, it will be entered into a regression analysis to determine the relationship between all of these economic and financial variables, and the coefficient of variation of each country. In this regression analysis, the coefficient of variation will be the dependent variable, whereas the economic and financial statistics will be the independent variables. This formula is illustrated below:

$CV_{Jordan} = (\text{GDP per capita}_{Jordan} + \text{interest rate}_{Jordan} + \text{inflation rate}_{Jordan}, \text{etc}\ldots)$

The result of this formula will test the dependence of the coefficient of variation on these economic factors, thereby testing the hypothesis. The countries with the lowest coefficients of variation will provide a better region to invest one's money, thereby offering the highest risk-reward tradeoff.

This study will use all secondary data. A good portion of the data will be financial statistics as well as analyses from scholarly journals and financial experts around the world. Microsoft Excel will be used in order to calculate the T-Test and Regression Analysis.

In order to determine the monthly returns of the stocks, data will be pulled from the *FactSet* database; which will ensure consistency in the source of information. The coefficient of variation (standard deviation divided by average return) will then be calculated. The data being analyzed will be from the past ten years (January 2000 through January 2010). Using these coefficients of variation the study will compare which stocks from the various stock exchanges show exceptionally high returns, or merely stable returns, while considering the amount of risk being taken. All of this data will then be put into MiniTab, in order to run the T-Test. The result of the T-Test will be a graph illustrating whether the statistical means of the varying stock exchanges' coefficients of variation are different or not.

After running this T-Test a second analytical portion of the thesis will be generated; the regression analysis. This will also be accomplished using MiniTab. In order to run this regression, the independent variables such as GDP per capita and inflation rate being used need to be researched and compiled. All of these variables for all the countries being analyzed are readily available using both economic agencies' websites as well as the *World Bank* website. These statistics will then be inputed into MiniTab to receive a regression analysis to test how much of an effect these variables have on the coefficient of variation. By running the regression analysis, conclusions can be drawn on which economic and financial indicators and statistics significantly impact the coefficients of variation. By identifying these statistics, a better evaluation of the investing environment of the country can be drawn.

Along with the calculations and data-based analysis being run, this thesis does include a portion in which the environment of Kuwait, Jordan, and Israel are discussed. For this, secondary data will be used to introduce each country, explain a brief history of the region, and provide justification for the hypothesis concerning the improving economies and potential investing environments of each of these regions.

TEL AVIV STOCK EXCHANGE (ISRAEL)

History

The Tel Aviv Stock Exchange is quite possibly one of the most influential aspects of Israel's economy. Based in Tel Aviv, the capital of Israel, it has progressed from its humble beginnings. Founded in 1953 to meet the growing demand for securities exchange, and the

formation of the state of Israel; the Tel Aviv Stock Exchange was formed through a coalition of banks and brokerage firms. Originally listing only a few securities, the TASE, as it is often referred to, now lists approximately 609 domestic companies for daily trading. This number is even larger when considering international companies listed on the TASE. Israel's only stock exchange also lists government bonds, exchange-traded funds (ETFs), as well as mutual funds and corporate bonds (Overview of TASE, 2011). Boasted as one of the most advanced stock exchanges in the Middle East, the TASE continually works to increase its technological capabilities as a world exchange as well.

Modern Status

Today, the TASE is on the top of the list for most-traded stock exchanges. In 1997, the Tel Aviv Stock Exchange was equipped with what is known as TACT, Tel-Aviv Continuous Trading, a fully automated trading system that has brought the TASE into the 21st century (Overview of TASE, 2011). Similar to the NYSE, the trading floors are now merely a tourist attraction, and the virtual trading that occurs millions of times each business day are done wireless and simultaneously via the new TACT system. The TASE's technology is comparable to that of the NYSE; however, the market capitalization is smaller than that of the NYSE.

AMMAN STOCK EXCHANGE (JORDAN)

History

The Amman Stock Exchange (ASE), based in Amman, the capital of Jordan, is one of the more recent stock exchanges to be founded. Established in 1999, the ASE was principally started as a nonprofit organization whose sole purpose was to help companies raise capital by listing their securities on the exchange (About ASE, 2011).

Modern Status

Today, the Amman Stock Exchange maintains strong relationships with the companies it serves, the Jordanian community, as well as other international stock exchanges. It has most recently joined in coalition with other Middle Eastern stock exchanges through the Union of Arab Stock Exchanges and the Federation of Euro-Asian Stock Exchanges (FEAS) (About ASE, 2011).

KUWAIT STOCK EXCHANGE (KSE)

History

The Kuwaiti Stock Exchange is the national stock exchange of Kuwait. Kuwait, a well-known banking region of the Middle East is proud to be home to one of the largest growing stock exchanges in the Gulf Region. Started in 1962 under government law, the stock exchange began as a small exchange of securities (About KSE - Objectives, 2008). Since its inception, the KSE has grown to offer securities in all industries present in Kuwait, from Real Estate, Energy and Banking.

Modern Status

The Kuwait Stock Exchange today offers securities, bonds, and mutual funds. It has enjoyed great success in recent years and has since gained worldwide acclaim. It is well respected across the world and is quickly becoming one of the most influential stock exchanges not just in the Middle East.

APPROACH

Stock & Stock Exchange Selection

The initial portion of the project involved selecting stock exchanges from a laundry list of worldwide exchanges to be the subjects of this thesis. In selecting stock exchanges, it was pertinent to maintain a consistent form of selection in order to uphold the integrity of the data, as well as the compatibility of the information and its ease of comparability. Historically, Market Capitalization often correlates to trading volumes, with the higher volumes belonging to those exchanges with the highest market capitalizations. With stock exchanges selected using market capitalization as the first criteria of selection and availability of information second,; the data and results would be the most accurate and not skewed. In selecting stock exchanges, those with the highest market capitalization were chosen as the comparative stock exchanges. As a result, the New York Stock Exchange (NYSE) of the US, the Frankfurt Stock Exchange (FSE) of Germany, the Tokyo Stock Exchange (TSE) of Japan, and the London Stock Exchange (LSE) of the UK were chosen. All of these stock exchanges are well known, well respected, heavily utilized worldwide, and have consistently been ranked as the top ten stock exchanges in the world (World's largest stock exchanges, 2007); based on highest market capitalization. The Tel Aviv Stock Exchange of Israel, Amman Stock

Exchange of Jordan, and the Kuwaiti Stock Exchange of Kuwait were all chosen based on the extent of research performed in which there was an interest in these particular exchanges. These exchanges, all in the Middle East, are often speculated to be the most prosperous of those located in the Middle East Region, yet little data has been collected on them. It is for this reason that this thesis came about. In order to select the stocks for each of these seven stock exchanges, the same selection criteria used to select the comparison exchanges was employed. Thereby, ten stocks, a number that is balanced enough to gather sufficient data to prove the hypothesis, were selected, based on the top ten highest market capitalization companies in each stock exchange. The other aspect of this data, prior to being retrieved, was the length or duration of time in which the data of each stock should be retrieved. It was settled that ten years was sufficient; which meant a timeframe of 2000-2010. This was decided upon due to the research encountered while completing the literature review. Quite a bit of research was conducted prior to 2000 and the "dot.com" bubble-burst. In addition, many of these stock exchanges, especially those in the Middle East, do not have sufficient records dating further than ten years.

Data Collection

Data collection consisted of reliance on a large database of financial information. *FactSet* research database, a database of financial information for analysts, companies, and organizations, offered the exact information needed to complete the data collection process. Yearly returns were collected in order to calculate the percentage returns from year to year. These returns, calculated manually, were calculated and saved in *Microsoft Excel*. At this point, it was a matter of time-consuming calculation to obtain the standard deviations of the stock each month. Once this was calculated, Coefficient of Variation (CV) was calculated by simply dividing the Standard Deviation, a measure of risk, over Return. The resulting number indicates the amount of risk being taken per unit of return.

RESULTS

T-Tests: Monthly Data

The T-Tests were used to perform a statistical analysis using two sets of variables in order to determine whether the means of the two groups of data are statistically different. There was a series of T-Tests run in order to test various data sets, pairing the sets of data by similarity or

by reason of comparison. After receiving the T-Test results three main data sets are analyzed. The first is the mean of each data set, taking into consideration how relatively accurate it is by how closely the two number of observations were in addition to the Variance and P Two-Tail value. The mean merely tells the analyst what the average mean of the data set was; however this is relative to the number of observations of each data set. If for example, two data sets each have 100 observations, and the mean of one variable set over the other is larger, then it is relatively accurate to claim that in general the mean of the first data set will be higher. However, if one set has 100 observations, and the other 60, the accuracy and validity of the T-Test is greatly reduced. In addition, the variance also plays an important role. If the variance is extremely high on a set of variables, the out-performance is greatly reduced due to the volatility of the data set. The P value for Two-Tail is the other statistic analyzed. This statistic, similar to the P-Value in the regression analysis, gives the overall effectiveness of the test. However, instead of assigning its full value to the test, its value must be divided in two; distributed equally among the two tails. In other words, the P-Value Two-Tail must be divided in two when analyzing the results in order to get a better account of what the actual value is. It is important to note that the T-Tests were run using the returns of the stocks on a monthly basis, and then when appropriate, a yearly basis. The monthly returns are used in this case, and when analyzing yearly T-Tests, the yearly prices were used. Return was used in order to make the two variable sets similar. Since there are some US stocks that have high prices, they would offset the T-Test in comparison to other exchanges.

The first T-Test run compared the US stock prices on a monthly basis, with those of the London Stock Exchange in Great Britain. The NYSE overwhelmingly outperformed the LSE with a mean of approximately 0.20% to 0.50% with equal observations. However, the variance for the NYSE was less than that of the LSE. This is important because it also indicates that although the UK may have a higher mean of stock prices, the variance for these is double that of the lesser mean stock prices in US. The next T-Test run is that of the US in comparison to the Frankfurt Stock Exchange. Although the variance was not too close to the FSE; being over three times that of the NYSE (SEE APPENDIX A); it is interesting how the Frankfurt stock exchange performed so closely to the NYSE. In addition, the FSE had more than 200 fewer observations than the NYSE. Therefore, the accuracy of the model is

decreased. The next three tests run were the NYSE in comparison to each of the three Middle Eastern Stock Exchanges. The results are expressly shown in APPENDIX A. In interpreting these three separate T-Test results, it can be said that although there were not concrete findings that would lead an investor to undoubtedly seek these stock exchanges as NYSE-alternatives; Jordan, Israel, and Kuwait all performed comparably to the NYSE in terms of low variance and mean return. In addition, the P-Value T-Stat was less than 0; making the test significant. After comparing country stock exchanges to other country stock exchanges, it was important to run more tests using multiple sets of data in each variable group.

In order to take an overall look at the performance of the sets of countries grouped by economic prosperity and well being, it was important to run a T-Test that compared two economically different sets of data. The next T-Test run was that of Japan, Germany, Great Britain, and the US; in comparison to the Middle Eastern countries of Israel, Jordan, and Kuwait. This T-Test compared the Developed companies, in comparison with the Undeveloped or more appropriately labeled Less Developed countries. This T-Test yielded very interesting results. The mean stock prices as seen in the corresponding APPENDIX A, show a mean of approximately 0.43% to 1.54%. The Lesser Developed countries have a variance almost identical to that of the Developed countries. It is also important to note that the observations were more or less the same making this model relatively accurate and valid. Next, in order to tie into the hypothesis directly, the NYSE was compared to the Middle Eastern stock exchanges of all three countries examined. This produced similar results as the prior test of country groups; however, the NYSE mean was decreased, while its variance was decreased also. This indicates that alone, the NYSE performs better than when diversified or grouped with the German, Japanese, and British stock exchanges.

The T-Tests run using the Monthly Stock Price data was useful in indicating the mean, variance, and P-Value statistics of two sets of data in comparison with one another. In order to maintain the integrity of the tests with respect to the two data sets gathered; another group of tests were run in order to analyze the Yearly or Annual Stock Returns.

T-Tests: Yearly Data

The same T-Tests were run using the Yearly Stock Price Data, using the returns as the variables to compare. The results of the Yearly T-Tests run were much different than the Monthly T-Tests. With such drastic differences in results, the validity and accuracy of the T-Tests is questioned; however, all the P-Value Two-Tails were significant except for the US in comparison to Great Britain and Germany.

In comparing all of the results from the yearly T-Tests to those of the Monthly T-Tests, the obvious result is that the Yearly T-Tests yielded larger numbers in terms of both means, as well as variances. The first test run compared the NYSE to the LSE. The LSE outperformed the NYSE as seen in APPENDIX B. However, the variance was four times greater. Taking into consideration the variance in comparison to the returns, the LSE still beat the NYSE. The FSE in comparison to the NYSE yields a different scenario. The mean return for the FSE is four times that of the NYSE, 1.4% and 10%; and the variance is also ten times larger on the FSE versus that of the NYSE. Therefore, it can be concluded that the two exchanges are similar in pattern and behavior.

The next test run compared the Developed nations with those of the Less Developed; just as in the prior test using monthly data. The results were still somewhat similar. Taking into account the variance, neither exchange grossly outperformed the other. The observation count was relatively close for both sets of data. The next set of tests run compared the US to the three Middle Eastern stock exchanges separately. Of the three exchanges compared, Kuwait was the only exchange to outperform the US in terms of overall performance. It had a higher mean return with a higher variance, but the residual return when taking into account the variance was still much higher than the US. Kuwait, at least based on this test alone, can be considered a relatively sound alternative to the NYSE.

The next test run compares the NYSE to the three Middle Eastern stock exchanges as a single variable set. This test, linked closely with the hypothesis of this study, proved that on a yearly basis, the results are similar for both regions. The NYSE and Middle East Stock Exchanges of Israel, Jordan, and Kuwait performed similarly on an annual basis. Monthly, the results were very different and the hypothesis was clearly void. However, when taken on a yearly

basis, the hypothesis would need further testing. Ideally, the most accurate test would take into account daily stock prices and their corresponding returns. Next, in order to further test the correlation of the coefficient of variation with the economic and financial variables that have been gathered, regression models were created and analyzed.

Regression Analysis: Monthly Data

While compiling the monthly data, it was perceived that a relationship would become apparent between the monthly coefficients of variation (CV) and the succeeding economic and financial market data. This would be established via the Regression Analysis in which the P-Value, the R-Square Value, as well as the T-Stat would all be examined very closely. At first sight, the monthly data did not yield any worthwhile results. The corresponding results can be seen in APPENDIX C. The first regression run was the monthly stock coefficients of variation against all of the economic and financial market factors. This produced an R-Square Value of 0.07% (please refer to APPENDIX C for a chart of corresponding regression results). This value tells the analyst that no significant relationship was discovered. The value of R-Square is a measure of "Coefficient of Determination". Coefficient of Determination, or R-Square, tells the analyst how much future accuracy and predictability can be accounted for with the statistic model that was just run. In simpler terms, the R-Square tells the reader how accurate the statistical model was at predicting future outcomes using the relations of all the variables used in the regression. With an R-Square of 0.07%, the regression model can be evaluated as insignificant. Another variable used to analyze the results of the regression model is P-Values. P-Values represent the significance of a particular variable used in the regression. The P-Value describes the probability of the test variable to be true, if the null set is in fact held to be true; therefore the lower the P-Value, the more significant. Finally the T-Statistic (abbreviated T-Stat) offers the analyst an added component to the probability of the relationship between the independent variable (GDP Per Capita, Inflation Rate, etc…) and the dependent variable (CV). The T-Stat coupled with the P-Value gives the reader a more accurate view of this relationship and also has an inverse relation. Similarly to how a small P-Value (less than 10%) indicates significance; a higher T-Stat implies significance as well. Almost always the two go hand-in-hand and the smaller a P-Value, the larger its corresponding T-Stat will be. Taking all of these variables into

consideration, these analyses must be applied to each of the regressions run for the monthly data set.

According to the first regression model run, using the Coefficient of Variation as the dependent variable and the economic and financial statistics as independent variables, the R-Square Value is both significantly small. This concludes, at face-value, that the regression did not establish any real significant information. However, it is important to note that beyond this face-value analysis, a deeper analysis was conducted to individually examine the P-Values as well as the T-Statistics of each of the independent variables (refer to APPENDIX D). As can be seen, no significant P-Values or T-Stats were identified and the result indicates that no valuable relationship was identified and the statistical model is invaluable. With a model that accounts for less than 1% of resulting data, one of two conclusions can be drawn; either the model is flawed and the independent and dependent variables have no relation, or there are some inaccuracies in the data. Taking into consideration that the coefficient of variation could possibly not be the best statistic of the monthly stock returns to analyze, it was decided to run a second regression using the Monthly Stock Returns as the dependent variable, rather than the coefficients of variation. The independent variables, the economic and financial data, were still kept the same.

In analyzing this new regression, the R-Square Value was still small and insignificant (refer to APPENDIX C). In addition to this, the individual independent variables were analyzed. This however, did show some significant P-Values and T-Stats. The economic statistics of inflation rate, FDI netflow, and interest rate, as well as the financial market factors of companies listed on the stock exchange as well as market capitalization showed P-Values well below zero; illustrating a significant relationship between the independent and dependent variables. Although significant, it did not help to support the hypothesis that stated the relationship of the markets would be illustrated in the Coefficients of Variation. In light of this small discovery, it was concluded that yet another modified regression would be run, in order to test and gather more relative data to establish a positive relationship between the independent and dependent variables. The next regression run used the Standard Deviation as the dependent variable and utilized the above mentioned economic and financial data as the independent variables.

The new statistical model yielded much better results in the sense that the R-Square Value was higher, and therefore more significant (refer to APPENDIX C). Through this analysis, more data was gathered and more statistical relationships established. Again, although these do not necessarily directly support the hypothesis of this project, it does still add significance and worth to the analyses and conclusions being drawn. With such a large R^2 value, the individual independent variables were closely analyzed to identify any trends that could be seen. However, upon closer inspection, only market capitalization was significant according to P-Values and T-Statistics. This did not offer more valuable data to help further explain the prediction in stock price fluctuations. As a result, the last regression that was run concerned the last variable not accounted for in the statistical models. The monthly stock prices themselves were used as the dependent variable, while the independent variables were kept constant.

This last regression, similar to the regression using the Standard Deviation as the dependent variable, yielded a significantly high R and R^2 Values. This again illustrates how accountable this model can be for the fluctuations in stock prices seen from month-to-month in these specific stocks. Upon closer examination of the individual independent variables, more relationships were identified and even more significant P-Values and T-Stats were recognized for specific variables used in the model. Among these were the Real GDP Growth, GDP Per Capita, the Interest Rate, the Inflation Rate, the Number of Companies Listed on the Corresponding Stock Exchange, Market Capitalization of the Corresponding Stock Exchange, the Stock Market Turnover Ratio, and FDI Netflow of that specific country. With such significance in these independent variables in relation to the dependent variable for the monthly stock prices, it can be concluded that these factors closely affect the monthly fluctuations in stock prices. According to the statistical model, this can account for approximately 50% or half of the reason for their fluctuations. At this point in time, this model does not explain the other 50% of logic for the monthly fluctuations.

After taking into consideration the results obtained through these four regressions and using several different dependent variables, it can be said that some inconsistencies have been seen, and some patterns have also been identified. In examining the data that was gathered and searching for possible flaws in the logic as well as inaccuracies and inconsistencies in the

data, one inconsistency did occur. This inconsistency was that although yearly statistics for the independent variables were used, such as annual GDP Per Capita, monthly stock prices were used as the dependent variable. The fact that monthly stock prices, monthly returns, yearly standard deviations, as well as monthly coefficients of variation were used does not convey consistency and does not allow for the data to be accurately compared in a statistical model. As a result, the same stock exchanges and stocks were used, and yearly or annual stock price data was gathered in the same fashion as the first data set. With this new data set, another set of regressions could be produced using the more consistent data. The second data set was formatted the same way as the monthly data set and the standard deviations and coefficients of variation were calculated the same ways. When all the data was gathered, it was perceived that this new data set would offer a more accurate relationship between the independent and dependent variables and the statistic model produced would be more accurate in illustrating this relationship and illustrating how accountable the independent variables are for the annual stock price fluctuations for the past ten years of data.

Regression Analysis: Yearly (Annual) Data

In running regression for the Annual Data Set, after discovering the inconsistency of the accuracy of the variables being used, an expected increase in the relationship and correlation between the independent and dependent variables was expected. In running the first regression using the original premise for the statistical analysis, the coefficient of variation as the dependent variable and the economic and financial market indicators as independent variables, similar results were seen as in the monthly stock prices. An R-Square of less than 1% (refer to Appendix E) shows that the regression was inefficient and produced no valuable analysis. Even the P-Values for each independent variable produced no significance. This is not different from the monthly prices and returns that were used in the original regression which yielded an R-Square of less than 0.01%. This draws a subtle but beneficial conclusion, the more accurate and consistent the statistics and variables, the more accurate the statistical analysis. Similar to the original Data Set 1; more regressions will be run using the different dependent variables of Standard Deviation, Annual Return Percentages, and Annual Stock Prices.

The next regression that was run was to test the correlation of the Standard Deviation as the dependent variable; keeping constant the independent variable from the first test. The new regression yields an R-Square of approximately 12%. This is a positive result because it is an improvement upon the original regression. The P-Values that had significance corresponded to the following independent variables: Real Interest Rate, Inflation Rate, FDI Netflow, and Market Capitalization. In addition, this result is similar to that of the monthly data set in which there was a severe improvement of statistical correlation between the two sets of variables. This pertained to the R-Square value rather than the P-Values of the independent variables. As is apparent, the standard deviation, although an inferior indicator in comparison to the coefficient of variation, is better suited for comparison and prediction of stock price fluctuations. As was performed with the monthly data set of values, the same regression will be run using the monthly stock returns as the dependent variable.

In performing the Annual Return-based regression, the R-Square was much less significant, yielding a much lower percentage of validity (refer to APPENDIX E). However, some independent variables did display significant P-Values, and therefore corresponding significant T-Stats. As can be seen in APPENDIX F, Real Interest Rate, Inflation Rate, Market Capitalization, Number of Companies Listed on Exchange, and Stock Market Turnover Ratio all showed significant P-Values; illustrating a strong correlation and relationship with the dependent variable. As has been seen in several of the regressions, both using the Monthly Data Set and the Annual Data Set, Real Interest Rate and Inflation Rate both show strong correlations to the dependent variables. In keeping with the consistency of the regressions, a final regression was run to determine the statistical relationship between the dependent variable of Annual Stock Prices and the normal set of independent variables that have consistently been used.

This last regression yielded similar results to that of the Return-Regression. The R-Square was approximately 8% (refer to APPENDIX E). This R-Square is not significant enough to be deemed as valid. This R-Square essentially describes or accounts for 8% of annual stock price fluctuations; which in this case correlate to the market capitalization of the stock exchanges. It correlates to this independent variable due to the fact that this variable was the only one to yield a significant P-Value. It yielded a value of less than 1%.

The Regression Analyses run for both the Monthly Data Set as well as the Annual Data Set (pertaining to the stock prices) produced very different results. Separately, both sets offer an insignificant amount of reliable data. However, together, they offer a base of results from which further tests can be run and a set of conclusions can be drawn. In looking at the current two sets of data, both monthly and yearly stock prices, one weakness was identified after testing. In looking at the information included in the data sets, dummy variables were identified as a missing piece of the data set.

Regression Analysis: Monthly Data with Dummy Variables

Dummies are also referred to as dummy variables or indicator variables in regression analysis. Assigned a value of either 0 or 1, dummy variables offer more accurate statistical analysis by increasing the coefficient of determination. In general, by increasing investments, one decreases the risk of a portfolio; the addition of dummies to a statistical model increases model fit and reduces generality. It was determined that in order to possibly increase the model fit of these sets of regressions, dummy variables would be placed in the model to represent each of the stock exchanges being analyzed. For each stock, its country of origin would correspond to that country's stock exchange dummy, represented by D_US, D_GB, and so on, and would be given the value of 1; whereas as the others in that line would be assigned the value 0. Before running the statistical analyses, the D-US, or NYSE dummy was removed from the regression set, in order to offer the model a means of comparison to that of the New York Stock Exchange. In other words, by removing the US dummy, the model created would illustrate how much better or worse the stock exchanges of each country would perform in comparison to the NYSE. This could be determined by using the same indicators as the other independent variables; the P-Values and T-Stats. The dummies were used in all of the same regressions using both the monthly data set as well as the yearly data set. Here are the results of the monthly data set models with dummies.

As is seen in the first regression run using the Coefficient of Variation as the dependent variable and the normal independent variables, the new statistical model produced using the dummy variables produced no significant R-Square and therefore does not represent an accurate model of how these variables are related. In this case, adding dummy variables did increase the model fit considering the R-Square increased. However, this increase was too

small to be considered significant and the R-Square still managed to stay lower than 1%. Next, the regression was run using the Standard Deviation as the dependent variable while introducing the dummy variables to the model.

The model fit for the regression using standard deviation as the dependent variable did increase significantly when the dummy variables for each country were introduced. Without the variables, the R-Square was approximately 25.5% (refer to APPENDIX G); yet with the dummy variables introduced, the R-Square increased significantly to over 68%. The countries that showed significant P-Values, and therefore outperformed the NYSE in terms of standard deviation, were: UK, Germany, Japan, Israel, Jordan, and Kuwait, all of them! This is a valuable analysis. In comparison to the NYSE, all of the stock exchanges being analyzed have larger standard deviations on a monthly basis. This in part means that these exchanges have larger risks associated with them, and also means they have the largest opportunities for return.

Next, the regression using monthly stock returns as the dependent variable was run. Similar to the model using CV as the dependent variable, the R-Square was still insignificant. Although the R-Square did increase slightly, it was still insufficient to create a model fit that would give any significant value. However, although the R-Square was still insignificant, all countries managed to outperform the NYSE in terms of stock exchange returns. This means that in general, these stock exchanges have higher monthly returns than the NYSE. This makes sense considering in the model prior, all of the stock exchanges outperformed the NYSE in terms of standard deviation. The two are positively correlated and this relationship was anticipated.

The last monthly regression run used the stock prices as the dependent variable. With the new dummies introduced, the R-Square increased from approximately 22% to almost 50%! This increase of more than double is attributable to the dummies and their increased model fit. In addition, all the stock exchanges outperformed the NYSE once again. On average, the stock exchange of the UK, Germany, Japan, Israel, Jordan, and Kuwait all experienced higher monthly stock price fluctuations than the US. In order to maintain consistency and further

test the increased model fit of the regressions, the same dummies were applied to the Yearly Data Set.

Regression Analysis: Yearly Data with Dummy Variables

The first regression run used the CV as the dependent variable. Similarly to the Monthly Data Set with the newly introduced dummy variables, the R-Square did increase slightly. However, this increase was not of enough value to deem the model noteworthy. In addition, as in the monthly data set, none of the country dummy variables showed significant P-Values; inferring that the stock exchanges of the countries being compared to the US did not outperform the NYSE in terms of CV. Next the regression using the Standard Deviation the dependent variable was re-run.

This statistical model, like the monthly regression, did increase the R-Square by almost double. However, the only country to outperform the NYSE was Japan. The other countries, on an annual basis, did not outperform the NYSE in terms of Standard Deviation.

When looking at the statistical model using the annual stock returns as the dependent variable and the dummies, the results were exactly the same as for the monthly data. The R-Square was increased but not significantly and all the countries' stock exchanges outperformed the NYSE. The dummy variables increased model fit, yet not significantly.

Lastly, the model using stock price as the dependent variable was re-run using the dummies. Although model fit was increased, R-Square was increased, and P-Values were slightly lower, the overall the regression was not significant and none of the countries outperformed the NYSE.

The addition of the dummy variables to each of the regressions was important because it increased model fit and increased statistical significance. Results for the Regressions using Yearly Data with Dummy Variables can be seen in APPENDICES I & J. With eight more regressions run, more conclusions were drawn and results gathered. Using all of these statistical models, patterns have been identified, weaknesses recognized, and conclusions complied. The conclusions that are drawn are of significance and can be accurately portrayed using the data compiled and tested. With more data, time, and tests, these conclusions can be

refined, corrected, and revised in order to offer a more accurate answer to the hypothesis presented at the beginning of this thesis.

CONCLUSIONS

In looking back and analyzing the analyses collected, the hypothesis can be disproven. Although the Middle East has had increasing economic stability, activity, growth, and sustainability, the overall coefficient of variation of the Middle Eastern stock exchanges of Israel, Jordan, and Kuwait is not larger than that of the NYSE. Although economic activity is presumed to precede financial infrastructural growth in the stock exchanges of the corresponding countries, it cannot be proven using these results that this will indicate positive stock exchange performance. The hypothesis stated at the beginning of the thesis cannot be proven using the results and data gathered in this study. The financial infrastructure and advancement of the national stock exchange does not necessarily follow economic re-surgence. In addition, the CV of the Middle Eastern stock exchanges was less than that of the NYSE. However, taking into consideration some weaknesses that are identified below, it is conceivable that the hypothesis can be proven with further testing.

Taking into consideration all of these concrete conclusions, more tests can be applied to further investigate the validity of the results and what supplementary conclusions can be drawn. In going further and looking back at the data sets, regressions, and results, certain weaknesses can be identified. Similar to when the monthly data was found to be inconsistent with the annual economic and financial indicators. Granted there have been no more inconsistencies in the data sets, one can assume that weaknesses will always exist. For future testing, the following weaknesses have already been identified and can be corrected in order to possibly create a more valid and indicative analysis of the hypothesis at hand.

MOVING FORWARD

Moving forward with the analysis, had more time been available, and more critiques been sought, the following weaknesses could have been pinpointed, corrected, and adjusted to help procure what could have been better, more accurate, and positive results. The first of these flaws identified is the lack of company financial information as independent variables in the

analysis. Another flaw identified was the use of the Berkshire Hathaway equity in the analysis of the NYSE. Although this is technically speaking a top ten equity on the NYSE in terms of market capitalization, it can be considered an outlier due to its abnormal stock price of over $100,000. Although technically valid in the sample taken, it can be seen as an equity that could have skewed the results due to its atypical growth and price.

Although economic information pertaining to the country of origin is important for the health and prosperity of a stock exchange; the key specific financial information of a company, such as the cash reserves, net income, liabilities, and liquidity are all valuable independent variables that fluctuate, and do in fact affect the stock price of a publicly-traded company; especially since the public has access to the information. Next, in looking at the depth of the data sets used in this analysis, a weakness in terms of data amount can be seen. Although ten years worth of data has been used, correlating to the last ten years of surging growth in the Middle East; if more time was available, twenty years worth of data could have provided a stronger correlation between the variables. The next possible flaw identified was the preferred use of daily stock prices, rather than monthly or even yearly prices. Had the pattern of the regressions been recognized earlier, the daily data on each stock could have been gathered and used in an analysis. However, time constraints prevented such revisions to the analysis. If such new levels of detail were added, the expected result would be a more accurate, increased model fit, as well as more concrete positive results to support the hypothesis.

APPENDICES

Appendix A – T-Tests for Monthly Data Set

T-Tests: Monthly Data Set							
	Mean – Variable 1	Mean – Variable 2	Variance – Variable 1	Variance – Variable 2	Observations – Variable 1	Observations – Variable 2	P Two-Tail
US vs. Great Britain	0.20%	0.50%	0.54%	0.73%	1200	1200	36%
US vs. Germany	0.20%	0.65%	0.54%	1.70%	1200	960	34%
Developed vs. Lesser Developed	0.43%	1.54%	0.94%	1.01%	3360	3356	< 0
US vs. Israel	0.20%	1.46%	0.54%	1.03%	1200	1200	< 0
US vs. Jordan	0.20%	1.76%	0.54%	1.18%	1200	1164	< 0
US vs. Kuwait	0.20%	1.36%	0.54%	0.79%	1200	992	< 0
US vs. Middle East	0.20%	1.54%	0.54%	1.01%	1200	3356	< 0

Appendix B – T-Tests for Yearly Data Set

T-Tests: Yearly Data Set							
	Mean – Variable 1	Mean – Variable 2	Variance – Variable 1	Variance – Variable 2	Observations – Variable 1	Observations – Variable 2	P Two-Tail
US vs. Great Britain	1.39%	7.60%	4.39%	12.87%	100	100	14%
US vs. Germany	1.39%	10.07%	4.39%	41.98%	100	89	23%
Developed vs. Lesser Developed	6.21%	22.93%	18.90%	26.57%	289	279	< 0
US vs. Israel	1.39%	23.66%	4.39%	29.79%	100	99	< 0
US vs. Jordan	1.39%	26.13%	4.39%	36.14%	100	97	< 0
US vs. Kuwait	1.39%	18.32%	4.39%	11.82%	100	83	< 0
US vs. Middle East	1.39%	22.93%	4.39%	26.57%	100	279	< 0

Appendix C – Regression Model: R-Square for Monthly Data Set

R-Square: Monthly Data Set	
Dependent Variable	**R-Square Value**
Coefficient of Variation	0.07%
Standard Deviations	25.56%
Stock Returns	0.66%
Stock Prices	21.22%

Appendix D – Regression Model: P-Value & T-Stat for Monthly Data Set

P-Value & T-Stat: Monthly Data Set			
Dependent Variable	**Independent Variable**	**Coefficient**	**P-Value**
Coefficient of Variation	Intercept	3.40	43.83%
	GDP Per Capita	0.00	19.10%
	Real GDP Growth	5.67	83.50%
	Inflation Rate	-9.68	78.25%
	Real Interest Rate	-28.79	41.55%
	Number of Companies Listed on Stock Exchange	0.00	50.27%
	Market Capitalization of Stock Exchange (Billions)	0.00	73.65%
	Stock Market Turnover Ratio	0.34	84.75%
	FDI Netflow (Billions)	-0.01	34.26%
Standard Deviation	Intercept	0.14	0.00%
	GDP Per Capita	0.00	1.17%
	Real GDP Growth	-0.09	0.00%
	Inflation Rate	-0.46	0.00%
	Real Interest Rate	-0.31	0.00%
	Number of Companies Listed on Stock Exchange	0.00	0.00%
	Market Capitalization of Stock Exchange (Billions)	0.00	0.00%
	Stock Market Turnover Ratio	-0.01	0.00%
	FDI Netflow (Billions)	0.00	0.00%

Return	Intercept	0.05	0.00%
	GDP Per Capita	0.00	12.71%
	Real GDP Growth	0.02	66.91%
	Inflation Rate	-0.31	0.00%
	Real Interest Rate	-0.32	0.00%
	Number of Companies Listed on Stock Exchange	0.00	6.29%
	Market Capitalization of Stock Exchange (Billions)	0.00	1.30%
	Stock Market Turnover Ratio	-0.01	0.01%
	FDI Netflow (Billions)	0.00	48.53%
Stock Price	Intercept	263.80	0.00%
	GDP Per Capita	0.01	0.00%
	Real GDP Growth	617.28	9.88%
	Inflation Rate	-5645.46	0.00%
	Real Interest Rate	-3618.95	0.00%
	Number of Companies Listed on Stock Exchange	0.38	0.00%
	Market Capitalization of Stock Exchange (Billions)	-0.07	0.00%
	Stock Market Turnover Ratio	-147.97	0.00%
	FDI Netflow (Billions)	-4.27	0.00%

Appendix E – Regression Model: R-Square for Yearly Data Set

R-Square: Yearly Data Set	
Dependent Variable	**R-Square Value**
Coefficient of Variation	0.87%
Standard Deviations	11.99%
Stock Returns	5.49%
Stock Prices	8.07%

Appendix F – Regression Model: P-Value & T-Stat for Yearly Data Set

P-Value & T-Stat: Yearly Data Set			
Dependent Variable	**Independent Variable**	**Coefficient**	**P-Value**
Coefficient of Variation	Intercept	-0.75	85.68%
	GDP Per Capita	0.00	69.94%
	Real GDP Growth	35.45	16.58%
	Inflation Rate	-27.74	40.53%
	Real Interest Rate	-18.24	57.72%
	Number of Companies Listed on Stock Exchange	-0.01	65.14%
	Market Capitalization of Stock Exchange (Billions)	0.00	58.26%
	Stock Market Turnover Ratio	0.00	79.52%
	FDI Netflow (Billions)	0.78	63.49%
Standard Deviation	Intercept	0.72	0.00%
	GDP Per Capita	0.00	14.57%
	Real GDP Growth	-0.33	51.00%
	Inflation Rate	-1.44	2.64%
	Real Interest Rate	-2.07	0.12%
	Number of Companies Listed on Stock Exchange	0.00	6.26%
	Market Capitalization of Stock Exchange (Billions)	0.00	2.81%
	Stock Market Turnover Ratio	0.00	36.87%
	FDI Netflow (Billions)	-0.03	39.50%

Return	Intercept	0.72	0.00%
	GDP Per Capita	0.00	16.09%
	Real GDP Growth	0.51	54.52%
	Inflation Rate	-4.44	0.01%
	Real Interest Rate	-4.64	0.00%
	Number of Companies Listed on Stock Exchange	0.00	55.84%
	Market Capitalization of Stock Exchange (Billions)	0.00	2.06%
	Stock Market Turnover Ratio	0.00	2.57%
	FDI Netflow (Billions)	-0.15	0.62%
Stock Price	Intercept	-117.98	96.58%
	GDP Per Capita	-0.01	84.83%
	Real GDP Growth	-1078.48	94.92%
	Inflation Rate	2482.80	91.05%
	Real Interest Rate	2189.17	91.95%
	Number of Companies Listed on Stock Exchange	-2.20	81.18%
	Market Capitalization of Stock Exchange (Billions)	0.71	0.08%
	Stock Market Turnover Ratio	-0.16	79.00%
	FDI Netflow (Billions)	23.91	98.24%

Appendix G – Regression Model: R-Square for Monthly Data Set With Dummy Variables

R-Square: Monthly Data Set With Dummies	
Dependent Variable	**R-Square Value**
Coefficient of Variation	0.10%
Standard Deviations	68.16%
Stock Returns	0.98%
Stock Prices	49.73%

Appendix H - Regression Model: P-Value & T-Stat for Monthly Data Set With Dummy Variables

P-Value & T-Stat: Monthly Data Set With Dummy Variables			
Dependent Variable	**Dummy**	**Coefficient**	**P-Value**
Coefficient of Variation	D_GB	4.22	74.45%
	D_DE	1.69	92.02%
	D-IL	1.24	94.48%
	D_JO	-1.79	92.60%
	D_KU	-0.63	97.41%
	D_JP	3.15	76.48%
Standard Deviations	D_GB	0.02	0.00%
	D_DE	0.07	0.00%
	D-IL	0.04	0.00%
	D_JO	0.05	0.00%
	D_KU	0.03	0.01%
	D_JP	0.17	0.00%
Return	D_GB	0.07	0.28%
	D_DE	0.08	0.70%
	D-IL	0.11	0.10%
	D_JO	0.11	0.14%
	D_KU	0.11	0.14%
	D_JP	0.07	0.02%
	D_GB	1206.53	0.00%
	D_DE	1621.12	0.00%

Stock Price	D-IL	1707.61	0.00%
	D_JO	1705.94	0.00%
	D_KU	1740.56	0.00%
	D_JP	3475.10	0.00%

Appendix I - Regression Model: R-Square for Yearly Data Set With Dummy Variables

R-Square: Yearly Data Set With Dummies	
Dependent Variable	**R-Square Value**
Coefficient of Variation	1.95%
Standard Deviations	23.35%
Stock Returns	7.51%
Stock Prices	8.36%

Appendix J - Regression Model: P-Value & T-Stat for Monthly Data Set With Dummy Variables

P-Value & T-Stat: Yearly Data Set With Dummy Variables			
Dependent Variable	**Dummy**	**Coefficient**	**P-Value**
Coefficient of Variation	D_GB	2.33	84.30%
	D_DE	0.51	97.36%
	D-IL	1.38	88.62%
	D_JO	-0.29	98.59%
	D_KU	-9.51	58.65%
	D_JP	-3.17	85.60%
Standard Deviations	D_GB	0.10	63.80%
	D_DE	0.35	20.70%
	D-IL	0.53	0.24%
	D_JO	0.32	27.39%
	D_KU	0.37	24.11%
	D_JP	0.14	65.28%
Return	D_GB	0.75	-0.25%
	D_DE	0.85	-12.85%
	D-IL	0.66	4.20%
	D_JO	1.23	19.63%
	D_KU	1.31	18.89%
	D_JP	1.27	15.48%
	D_GB	-7002.92	37.05%
	D_DE	-8122.47	42.46%

Stock Price	D-IL	-3839.17	54.82%
	D_JO	-7245.37	50.00%
	D_KU	-7688.71	50.88%
	D_JP	-7728.69	50.54%

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