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ARE THERE SIGNIFICANT PREMIUMS IN THE SAUDI STOCK MARKET?

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Abstract

Saudi Arabia has announced the opening of its Stock Exchange for qualified foreign investors starting June 15, 2015. The decision to open up the largest stock market in the MENA region marks a major milestone that deserves special recognition. Given the presence of factor anomalies in other stock markets, we examine whether similar conditions occur in the Saudi market. Specifically, we test for the existence of significant premiums to volatility, size, momentum, value, and dividend yield in the Saudi stock market, over the period from January 1999 to December 2014. The findings confirm the existence of significant premiums for all of the factors under investigation. Interestingly, we encounter a remarkable anomaly in which riskier assets do not necessarily offer higher returns. Such findings could prove valuable for both investors and policymakers — especially for retail investors who mistakenly believe that higher risks result in higher rewards.

Keywords: Saudi Stock Exchange, Multifactor Model, and factor premiums.

JEL Classifications: G10, G11, G12, G18, G20.

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1. Introduction

A key question when investing in equity markets is how to properly capture significant factor premiums that largely determine the pattern of stock returns. There are a large number of factors that influence the performance of stocks. On the one hand, there are common factors that systemically affect stock markets worldwide, although possibly with different lags and magnitude. The recent financial crisis is an example of a common shock that caused turmoil in many stock markets across the globe. However, economic differences exist across countries. Idiosyncratic components such as sectorial-specific factors can certainly influence equity prices. As indicated by Alkhareif and Barnett (2015a), the downturn in the Saudi stock market in 2006 clearly exemplifies the existence of country-specific factors.[1]

> "The stock market decline in 2006 was the case of a classical asset bubble caused by a flood of oil money. The boom-bust cycle was exacerbated by retail investors who drove the average P/E ratio to a value higher than 50 at one point."(page 54)

Many financial studies attempted to capture the dynamics of equity returns using a number of meaningful factors.[2] Such factors include CAPM beta, momentum, size, value, and dividend yield. In this context, Fama and French (2012) examined the relative importance of size, value, and momentum for stock returns in four key regions (North America, Europe, Japan, and Asia Pacific). Their findings confirm the significant explanatory power of return momentum and value premiums in small cap stocks for all of these regions except Japan. Other studies have also confirmed the significance of value and momentum in the US [e.g., see Fama and French (1992, 1993), Jegadeesh and Titman (1993), as well as Lee and Swaminathan (2000)]. Baker and Haugen (2012) analyzed 21 developed and 12 emerging market economies and concluded that low-volatility stocks outperformed their high-volatility counterparts. Cheung, Hoguet, and Ng (2014) applied multifactor models to explain the pattern of stock returns in China's A-Share Market. Their

[1] In this connection, using comprehensive macroeconomic analysis in addition to the multifactor analysis could prove valuable for investors. It is extremely important to ensure the availability of information and reliability of the financial data being used. As indicated by Barnett (2012), investors, to a large degree, lack access to reliable financial data and, because of using erroneous financial indicators, they were misled and failed to foresee the possibility of a coming financial crisis. The growing use of advanced financial indicators (including recent innovations such as Divisia indexes) by many monetary authorities is indicative of the importance of developing and using reliable indicators. See Alkhareif (2013) as well as Alkhareif and Barnett (2012, 2013, 2015a) for more details regarding the Divisia measures.
[2] For more details, see Sharpe (1964), Mossin (1966), Fama and French (1992), and Carhart (1997).

findings suggest that only two factors (i.e., value and dividend yield) contain positive and significant explanatory power in the stock returns. Other factors, including CAPM beta, size, momentum and volatility, were insignificant in explaining the stock returns' pattern.

The main goal of this study is to test for the existence of significant factor premiums in the Saudi stock exchange. This exchange, the largest in the Middle East, is evolving rapidly and soon qualified foreign investors will join the market. Such developments will certainly influence the behavior of the market, as domestic retail investors have been the dominant player in the market since inception. Therefore, it is extremely useful for both investors and policymakers to carry out further empirical research and analysis, especially during this critical transition period.

This paper examines the existence of significant premiums to volatility, size, momentum, value, and dividend yield in the Saudi stock market. The paper is organized as follows: Section 2 provides an overview of the Saudi economy, with more emphasis on its capital market; Section 3 outlines the methodology used in this study; Section 4 describes the dataset and sources; Section 5 discusses the empirical results; and lastly Section 6 concludes the paper.

2. An Overview of the Saudi Economy and its Capital Market (Tadawul)

As a G-20 member, Saudi Arabia continues to play a major role in the global economy through different channels, the most important being the oil market. The Saudi economy has been among the top performing economies within the G-20 and continues to be the largest in the MENA region, according to the International Monetary Fund (*World Economic Outlook*, 2015). The substantial decline in oil prices that began in June of 2014 posed a challenge for many oil-exporting countries, but the Kingdom has managed to withstand the adverse impact of falling oil prices due to strong economic fundamentals and prudent monetary and fiscal policies. Such fundamentals include a prolonged period of current account surpluses, enormous foreign exchange reserves, strong fiscal buffers, moderate inflation rates, and low government debt (projected by the ministry of finance at around 1.6 percent of GDP in 2014).

Monetary policy in Saudi Arabia is autonomously executed by the Saudi Arabian Monetary Agency (SAMA). SAMA was created in 1952 and the national currency (the Saudi riyal) is currently pegged to the U.S. dollar at SAR 3.75 per US dollar. Because a large amount of exports

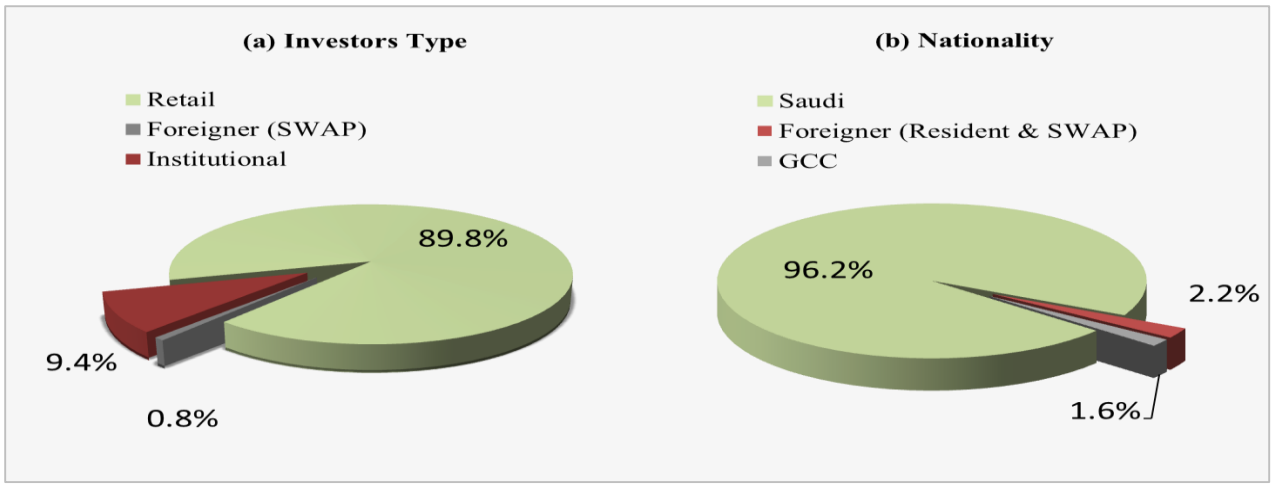
and government revenues are denominated in U.S. dollars, a dollar peg ensures stable capital flows and contributes toward higher financial stability. Safeguarding the banking system is highly important to ensure financial stability and maintain a high level of investor confidence, especially in the capital market. In this regard, banks in Saudi Arabia are well capitalized, liquid, and profitable. The banking system has already met all of the Basel III standards and has traditionally been closely supervised by SAMA.

The Saudi stock exchange was established in 1954. During the 1980s, SAMA took the responsibility of developing the stock market and was able to establish the basis for a fully functioning stock market in the Kingdom. Later in 2003, the cabinet passed the Capital Market Law and accordingly the Capital Market Authority (CMA) was founded. Since then, the CMA has been the primary regulator and developer of the capital market. Over the last decade, the CMA has promulgated guidelines to promote fairness, efficiency, and transparency, as well as vigorous protection to market participants.[3]

Although residents as well as GCC citizens can directly invest in the market, foreign investors were not allowed to invest in the equity market directly, but only via swaps and mutual funds. According to the recent reports published by Tadawul, foreign investors abroad own less than one percent of the market, while overall foreigners (swap and residents) account for about 2.2 percent of the market (Figure 1).

[3] Information pertaining to the CMA can be found via the authority website: www.cma.org.sa.

Figure 1: Investor Type and Nationality as of February 2015 (Percentage of Value Traded)



Source: TADAWUL

In mid-2014, Saudi Arabia implemented an important national policy decision on equity market liberalization by opening up the market to qualified foreign investors on June 15, 2015. Such a policy action has a fundamental impact on both the financial system and the real economy of Saudi Arabia. The opening up of the market will likely *i)* stimulate capital inflows; *ii)* boost domestic equity market values; and *iii)* put a downward pressure on the cost of capital—all of which will lead to a stronger market-wide investment growth. The efficiency of the market is expected to advance further when institutional investors join the market, because listed companies will aim for better corporate governance and higher transparency in an effort to attract competitive funding sources.

The Saudi stock exchange is the most liquid and largest in the MENA region, with a market capitalization exceeding SAR 2,026.3bn ($530.0bn) at the end of 2014 (Table 1). The Saudi Market is also bigger than some advanced markets such as the Borsa Instabul (the Turkey Stock Market). The Saudi stock exchange comprises 169 listed companies, in which the Materials and Financials categories account for more than 50 percent of the market capitalization — highlighting the significance of these two sectors in the domestic economy (Table 2). The liquidity and dynamics of the Saudi stock exchange are relatively more advanced than in other regional markets. The performance of the market is robust due to multiple factors such as strong economic fundamentals, predictable policies, prudent regulations, and stringent supervision. In this regard,

the Saudi market is considered an attractive investment destination, domestically as well as internationally.

Table 1: Size of Equity Markets in Selected Countries (2014)

Country	Number of Companies	Total Market Cap (Billion$)	Liquidity* (Million$)	Market Cap (% to GDP)
Bahrain	44	19.6	44	61.0
Kuwait	200	104.7	102	56.5
Egypt	256	70.9	129	26.1
Jordan	238	25.7	19	75.8
Morocco	73	54.7	11	52.1
Oman	128	26.4	41	32.8
Qatar	43	193.7	254	95.6
Russia	1173	671.5	1,200	31.7
Saudi Arabia	169	531.4	2,740	71.3
Turkey	445	279.7	1,490	33.8
UAE	110	228.3	732	57.6

* Liquidity is computed as the 6-month average daily trading volume.

Source: Deutsche Bank.

Table 2: Sectorial Composition of TASI (as of February 2015)

Sectors	Weight (%)	No. of companies
Banks & Financial Services	28.9	12
Petrochemical Industries	22.8	14
Telecommunication & Information Technology	8.3	5
Agriculture & Food Industries	6.4	16
Real Estate Development	6.3	8
Cement	4.6	14
Multi-Investment	4.2	7
Retail	4.1	14
Energy & Utilities	4.1	2
Industrial Investment	3.8	14
Insurance	2.3	35
Building & Construction	1.5	17
Hotel & Tourism	1.4	4
Transport	1.1	4
Media & Publishing	0.2	3
Total	100	169

Source: TADAWUL

Capital inflows to the Saudi market could exceed 30 billion USD, assuming a level of foreign ownership similar to those in other neighboring countries. A simple comparison of countries with liberalized stock markets in the region indicates that the foreign ownership of stocks could increase from less than one percent to 4-10 percent. The market liquidity is expected to improve even further, as the share of foreign investors trading in the market increases. Assuming that the Saudi stock exchange exhibits similar trends to those in other GCC countries, the average

daily trading volume of the Saudi's exchange market is expected to increase by around 12.5 percent after opening up the market.

A large number of studies have shown that greater equity market liberalization reduces both the cost of capital and dividend yields and increases growth in aggregate investment, which in turn boosts potential output [e.g., see Henry (2000) and Geert & Campbell (2000)]. Further market liberalization arguably benefits both the capital market and the real economy. One reason is that small and medium enterprises (SMEs) that are characteristically labor-intensive would likely benefit from the influx of capital into the domestic economy. As SMEs grow and become more lucrative due to the secondary effect of the improved capital market conditions, aggregate demand will accelerate.

Another economic implication of opening up the Saudi equity market is that foreign investors will have the opportunity to further diversity their global equity portfolios and benefit from greater financial market access to a key G-20 member country with the largest equity market in the MENA region. As indicated in Table 3, the Saudi stock market exhibits mixed correlations with respect to different markets and indicators. The Saudi market is negatively correlated with the U.S. dollar index (DXY) as well as the volatility index (VIX). On the other hand, the Saudi stock exchange exhibits positive correlation with the oil market (Brent crude oil prices), the MSCI Emerging Market Index (MSEM), and the MSCI GCC Countries ex Saudi Arabia Index (MSGCC). Foreign exchange risk is minimized for US dollar-based investments, given the large foreign reserves and the credible commitment of SAMA to maintain the dollar peg.

Table 3: Correlation Matrix (January 2005-March 2015)

Variable	DXY	VIX	NYSE	S&P	Brent	TASI	MSEM	MSGCC
DXY	1.00							
VIX	0.38	1.00						
NYSE	-0.62	-0.70	1.00					
S&P	-0.53	-0.70	0.98	1.00				
Brent	-0.60	-0.51	0.59	0.56	1.00			
TASI	-0.14	-0.24	0.37	0.36	0.50	1.00		
MSEM	-0.61	-0.60	0.86	0.79	0.53	0.40	1.00	
MSGCC	-0.35	-0.31	0.56	0.54	0.42	0.51	0.51	1.00

Source: Bloomberg

3. Methodology

This study estimates five-factor asset-pricing model for the Saudi stock exchange. Our analysis is based on the multifactor models introduced by Fama and French (1993, 2012) and further developed by Cheung, Hoguet, and Ng (2014).[4] Specifically, the paper runs the following regression:

$$R_{it} - R_{ft} = \alpha_i + \beta_i\left(R_{mt} - R_{ft}\right) + \gamma_i SMB_t + \lambda_i HML_t + \omega_i WML_t + \eta_i Yield_t + \nu_i Volatility_t + \varepsilon_{it} \quad (1)$$

where R_{it} is the return on portfolio i and R_{ft} is the risk-free rate at time t. Thus, the left hand side of the equation stands for the excess return of the ith portfolio at time t. The variables in the right hand side R_{mt}, $SMB_t, HML_t, WML_t, Yield_t,$ and $Volatility_t$ are market return, size, value, momentum, dividend yield, and volatility factors, respectively. Their corresponding coefficients

[4] For simplicity reasons, we decided to carry out our empirical analysis without performing any pre-regression and post-regression examinations, in line with Cheung, Hoguet, and Ng (2014). We leave this task for future research.

are $\beta_i, \gamma_i, \lambda_i, \omega_i, \eta_i, \nu_i$, whereas α_i and ε_{it} represent the intercept and the error term, respectively.[5] Obviously, $(R_{mt} - R_{ft})$ is considered as the returns of the market premium and hence its coefficient, β_i, is the CAPM standard market premium. We use the 12-month SAMA Bills rate as a proxy for the risk-free rate, R_{ft}.

Regarding the right hand side variables, the market premium factor, $R_{mt} - R_{ft}$, is computed as the difference of the market return and the risk-free return in each month. In order to construct the size factor, SMB_t, we apply the following procedure:

I. Cluster the universe (all stocks in TASI) into two buckets: small caps, which account for 10 percent of total market capitalization, and big caps which account for 90 percent of total capitalization.
II. Divide each bucket into three groups (low, neutral, and high) based on the book-to-market ratios with weights equal to 30, 40, and 30 percent, respectively (Table 4).
III. Take the average returns for the three small-cap portfolios and the three big-cap portfolios.
IV. Finally, the size factor is generated by subtracting the average returns for the three big-cap portfolios from their small-cap portfolios counterparts.

Table 4: Factor Construction

	Factors (e.g., HML, WML, Yield, Vol.)			
Size	Small/Low	Small/Neutral	Small/ High	10% of Market Cap
	Big/ Low	Big/ Neutral	Big/High	90% of Market Cap
	30% of securities	40% of securities	30% of securities	

[5] The error term is assumed to be independent and normally distributed.

To construct each of the remaining four factors (i.e., HML, WML, Yield, Volatility), we subtract the average returns of the low portfolios (i.e., Small/ Low and Big/Low) from the average returns of the high portfolios (i.e., Small/ High and Big/High).

For the left hand side variable, $R_{it} - R_{ft}$, we generate a total of 64 sub-portfolios using the technique by Cheung, Hoguet, and Ng (2014). For each factor, we divide our universe into quartiles and compute average monthly excess returns for 4x4 portfolios formed by using the size factor in one dimension and the remaining factors (independently) in the other dimension. More specifically, we build 16 portfolios for each factor under examination by using the double-sorting technique in which the constituents of our universe (i.e., TASI) are divided into 4x4 portfolios. For each portfolio, we use the size factor in one dimension and in the other dimension we use the other factors (i.e., value, momentum, yield, and volatility) independently. Many studies concurred with the use of stock capitalization (size) as a common factor when constructing the sub-portfolios [see, e.g., Chan and Chen (1988)].

4. Data Descriptions and Sources

The analysis of this study covers all listed companies in the Saudi stock exchange (Tadawul) over the period from January 1999 to December 2014. This period range was constrained by the availability of data pertaining to the Saudi stock market. Our data were obtained from the Tadawul, CMA, SAMA, Factset (provided by Worldscope and Morningstar), and Bloomberg databases. We used the Alpha Testing Package from Factset to carry out our analysis.

Variables taken into consideration in the estimation of our multifactor model consist of stock returns, market capitalization, shares price, and the outstanding number of stocks. Key market indicators used in this paper include book-to-market value and average daily trading volumes. The 12-month SAMA Bills rate was used as a proxy for the risk-free asset return.

The size factor is defined in terms of market capitalization. Volatility is defined as the standard deviation of the stock's returns over a 12-month horizon. Value is constructed based on book-to-market ratios, while momentum is measured by computing the cumulative gross return for each stock over the past 12 months. Yield factor is constructed from companies' dividend yield

data. Finally, the analysis is based on the Saudi riyal, the official currency for trading stocks in Tadawul.[6]

5. Results

5.1. Factor Returns (explanatory variables)

Table 5 reports the average monthly premiums for our factors in the right hand side of equation 1 over the period from January 1999 to December 2014. All of our factors generate significant premiums. Our analysis indicates that the Saudi Stock Market (TASI) has 1.08 percent average monthly market premium, which is significant at the 1 percent level. The high market volatility (6.77 percent) is driven by the speculative retail investors who dominate the trading activities in the local market. For the size factor, the average monthly premium is 40 basis points with 10 percent significance level. The average monthly premium for both the value factor as well as the volatility factor is around 72-73 basis points with 5 percent significance level. Finally, the momentum and yield factors generate average monthly returns of 48 and 50 basis points with 5 and 10 percent significance levels, respectively.

Table 5: Summary Statistics for Factor Returns (Jan 1999 - Dec 2014)

	Market	*SMB*	*HML*	*WML*	*Yield*	*Volatility*
Mean	1.08	0.40	0.72	0.48	0.50	0.73
St. Dev	6.77	3.54	5.86	1.80	2.49	6.14
T-Mean	2.20	1.58	1.70	1.83	1.36	1.66
Significance	99%	94%	95%	97%	91%	95%

The analysis in Table 6 suggests that the market is positively correlated with our main factors. Value and volatility factors exhibit stronger correlation with the market (0.27) compared

[6] Given the fact that the Saudi riyal (SAR) has been solidly pegged to the USD since mid-1986, exchange rate risk is negligible. Thus, carrying out our analysis in either SAR or USD should lead to the same conclusion.

to the other factors. Size is positively correlated with momentum (0.39) and yield (0.14), but negatively correlated with both value (0.09) and volatility (0.11). Interestingly, value and yield show a strong positive correlation at 0.76, whereas momentum and volatility have a strong negative correlation at 0.35. Such findings could prove valuable for portfolio diversification purposes.

Table 6: Factor Correlation Matrix (Jan 1999 - Dec 2014)

	Market	SMB	HML	WML	Yield	Volatility
Market	1.00					
SMB	0.05	1.00				
HML	0.27	-0.09	1.00			
WML	0.03	0.39	0.09	1.00		
Yield	0.08	0.14	0.76	-0.09	1.00	
Volatility	0.27	-0.11	0.04	-0.35	0.11	1.00

5.2. Portfolios Returns (response variables)

Table 7 displays the average monthly excess returns for 64 portfolios forming the left hand side variables in equation 1. Table 7 (a) reports the average monthly excess returns for 16 portfolios formed on size and value. The Small/High portfolio has the highest earnings of 8.0 percent, in line with our expectations. The average return on small cap portfolios of 3.3 percent exceeded the average return on large cap portfolios (1.6 percent), which is consistent with the finance literature. Similarly, the average return on high value portfolios (4.6 percent) was greater than the average return on low value portfolios (1.9 percent). The analysis shows that the average returns on portfolios are monotonic with respect to value, where average returns on portfolios High, 2, 3, and Low are 4.6, 2.9, 2.7, and 1.9 percent, respectively. However, the average returns on portfolios with respect to size are non-monotonic, as average yields on mid-cap portfolio 3 (4.3 percent) is the largest.

For the portfolios formed on size and yield, we find that the average return on a portfolio of small cap stocks with mediocre dividend yields (i.e., Small/3) is the highest at 7.2 percent, as indicated in Table 7 (b). Although the average return on small cap portfolios (3.3 percent) was the

largest, the average return on high yield portfolios of 80 basis points did not exceed the average return on portfolios 2 and 3. The non-monotonicity in returns with respect to yield may have been caused by the speculative behavior of retail investors who dominate the trading volumes in the market.

Consistency in average returns was met for the momentum portfolios. As shown in Table 7 (c), the average return on portfolios with respect to momentum was the highest for high-momentum stocks (3.0 percent) and the lowest for low-momentum stocks (0.7 percent). The average return on mid-cap stocks (size 2) was the highest with 2.7 percent rate of return. A potential explanation for this outcome is that the fairly high trading volumes over this tier of stocks by retail investors pushed up the returns on this particular group of stocks.

A key finding of this paper is that the volatility in the Saudi market does not necessarily reward investors. The concept that high-risk stocks should provide greater returns in order to compensate for their riskiness is apparently not fully applicable to the Saudi stock market. As shown in Table 7 (d), the average return on high-volatility portfolios at 2.0 percent is lower than the average return on portfolio 2 (2.3 percent) and portfolio 3 (2.2 percent). However, the findings suggest that marginal increase in volatility could boost returns, for which the average return on portfolio 2 was the highest at 2.3 percent. The marginal return on portfolios with volatility beyond portfolio 2 is diminishing, which suggests that investors are worse off by investing in highly volatile stocks. Our findings that high volatility is not always associated with higher returns are in line with the findings by Baker and Haugen (2012) and Thomas and Shapiro (2009). Both papers have shown empirically that low volatility stocks have outperformed high-volatility stocks in the world equity markets.

Table 7: Average Monthly Excess Returns for 64 Portfolios (Jan 1999 - Dec 2014)

(a) Average Monthly Excess Returns for 16 Portfolios Formed on Size and Value

	Portfolio Returns					Standard Deviation				
	High	2	3	Low	Average	High	2	3	Low	Average
Small	8.0%	1.4%	2.4%	1.2%	3.3%	20.5%	39.1%	12.6%	17.7%	22.5%
2	4.7%	3.7%	4.3%	-0.7%	3.0%	10.5%	9.4%	10.0%	10.7%	10.2%
3	3.3%	5.7%	2.8%	5.4%	4.3%	9.1%	8.5%	8.3%	8.9%	8.7%
Big	2.4%	0.8%	1.4%	1.7%	1.6%	7.0%	7.2%	6.5%	11.1%	7.9%
Average	4.6%	2.9%	2.7%	1.9%		11.8%	16.0%	9.4%	12.1%	

(b) Average Monthly Excess Returns for 16 portfolios Formed on Size and Dividend Yield

	Portfolio Returns					Standard Deviation				
	High	2	3	Low	Average	High	2	3	Low	Average
Small	-0.1%	4.1%	7.2%	2.1%	3.3%	20.5%	19.9%	11.0%	9.5%	15.2%
2	1.9%	2.3%	2.8%	0.9%	2.0%	13.6%	10.6%	13.5%	29.6%	16.8%
3	0.9%	0.9%	0.5%	-2.3%	0.0%	6.7%	7.4%	9.6%	17.2%	10.2%
Big	0.7%	0.7%	1.5%	1.7%	1.1%	16.3%	7.9%	8.0%	19.2%	12.8%
Average	0.8%	2.0%	3.0%	0.6%		14.3%	11.4%	10.5%	18.9%	

(c) Average Monthly Excess Returns for 16 Portfolios Formed on Size and Momentum

	Portfolio Returns					Standard Deviation				
	High	2	3	Low	Average	High	2	3	Low	Average
Small	2.6%	2.7%	3.1%	0.9%	2.3%	12.0%	13.9%	11.5%	11.7%	12.2%
2	3.3%	3.3%	2.2%	2.3%	2.7%	14.7%	12.0%	10.4%	11.8%	12.2%
3	4.0%	1.9%	2.0%	-1.2%	1.7%	9.7%	7.4%	8.4%	10.1%	8.9%
Big	2.2%	1.0%	0.5%	1.0%	1.2%	7.6%	7.8%	6.7%	7.5%	7.4%
Average	3.0%	2.2%	1.9%	0.7%		11.0%	10.3%	9.3%	10.3%	

(d) Average Monthly Excess Returns for 16 Portfolios Formed on Size and Volatility

	Portfolio Returns					Standard Deviation				
	High	2	3	Low	Average	High	2	3	Low	Average
Small	2.9%	2.3%	2.8%	2.4%	2.6%	16.8%	11.3%	14.1%	12.1%	13.6%
2	1.7%	3.4%	2.5%	1.8%	2.4%	11.7%	12.1%	11.1%	12.3%	11.8%
3	2.7%	2.3%	2.2%	0.3%	1.9%	8.2%	8.4%	8.3%	9.7%	8.7%
Big	0.7%	1.1%	1.4%	3.1%	1.6%	6.7%	8.5%	6.9%	4.9%	6.8%
Average	2.0%	2.3%	2.2%	1.9%		10.9%	10.1%	10.1%	9.8%	

5.3. Regression Estimates

In this subsection, we present the results of our multifactor regressions. Based on equation 1, we regress the monthly excess returns of 64 different portfolios on our factors. Table 8 reports the coefficient estimates (intercepts and slopes) along with their t-statistics for the 16 portfolios formed on size and value, over the period from January 1999 to December 2014. Almost all of the 16 size-value portfolios have a market beta close to one, which indicates that their returns are highly linked to market performance. The only exception is for portfolio Small/2, where the beta coefficient is equal to 0.11. Thus, the return on this portfolio is only weakly correlated with the market returns.

The regression coefficient on the size factor is positive for all portfolios, except for portfolios Small/2 and Big/High, in which the coefficient estimates are statistically insignificant. The coefficient estimates with respect to the value factor are all positive, but few are statistically insignificant, including the Big/Low portfolio. The momentum slopes are predominantly negative, but only 7 portfolios out of the 16 are statistically significant at the 5 percent level. Our 16 portfolios have mixed exposure to both yield and volatility, for which some coefficients are positive, others are negative, and most are statistically insignificant. Regression estimates for the remaining portfolios formed by size-momentum, size-yield, and size-volatility are displayed in tables 9-11, respectively. The patterns in regression estimates for these portfolios are to some extent similar to those for the size-value portfolios.

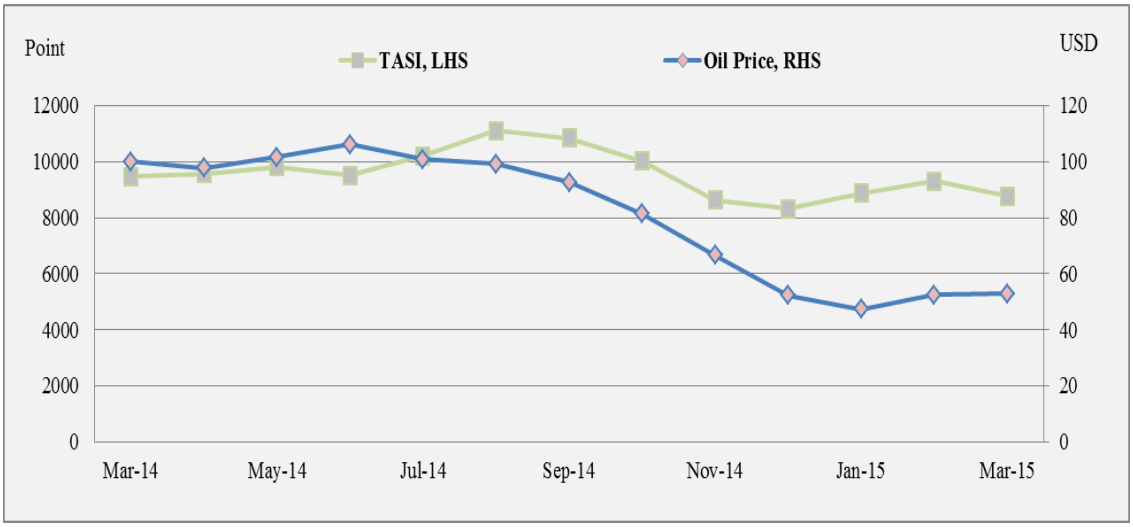
It is worth mentioning that we have found that the intercept estimates are significantly non-zero in only a few cases. In some cases, the intercept was found to be negative and in others the intercepts were positive. Our findings of non-zero intercepts are in line with the findings of Fama and French (2014). Whenever non-zero intercepts occur, we can conclude that the portfolios' regression models are rejected as they cannot fully capture the factors' expected returns.[7]

In this circumstance, using comprehensive macroeconomic analysis in addition to the multifactor analysis could prove valuable for investors. Candidate models include the dynamic factor models explained in Stock and Waston (2011), Forni and Lippi (2011), and Alkhareif and

[7] See Merton (1973) as well as Fama and French (2012) for more details regarding the zero-intercept hypothesis.

Barnett (2015b). The recent developments in the oil market have impacted the behavior of the Saudi stock market and hence taking oil market development (as a key factor) into consideration could be suitable for a better understanding of the Saudi stock market (Figure 2).

Figure 2: TASI and the Arab Light Crude Price



Source: OPEC, TADAWUL

Although the primary focus of this paper was to test for the existence of factor premiums in the Saudi stock market by using the multifactor models found in Cheung, Hoguet, and Ng (2014), future studies can build upon this work to further advance the analysis of the Saudi stock exchange. In this regard, we propose examining the existence of time dependency in Fama-French portfolios and calculating autocorrelations of their returns [Susarla (2004)]. The efficiency of the Saudi market can be further examined by running autocorrelation and cointegration tests in line with Alkholifey (2000). Measuring the degree of integration between the Saudi stock market and other GCC stock markets is also valuable in this context [Alsuhaibani (2004)].

Lastly, it is extremely important to ensure the availability of information and reliability of the financial data. As indicated by Barnett (2012), investors to a large degree lack access to reliable financial data and, because of using erroneous financial indicators, investors did not foresee the possibility of a financial crisis. The growing use of advanced financial indicators (including innovations such as the new Divisia indexes) by many monetary authorities is indicative of the importance of developing and using reliable indicators. Refer to Alkhareif (2013) as well as Alkhareif and Barnett (2012, 2013, 2015a, 2015b) for more details regarding the Divisia measures.

Table 8: Regression Estimates for the 16 Size-Value Portfolios (Jan 1999-Dec 2014)

	Low	2	3	High	Low	2	3	High
		α				t(α)		
Small	1.76	1.13	0.88	-1.66	1.13	0.49	0.54	-1.19
2	-1.09	-2.12	3.39	-3.56	-0.90	-1.98	3.08	-3.46
3	-0.98	0.46	0.76	-0.29	-0.98	0.55	0.83	-0.34
Big	1.90	-0.17	1.29	0.14	3.17	-0.29	2.90	0.17
		β				t(β)		
Small	0.53	0.11	1.07	0.76	4.31	0.59	8.34	6.90
2	0.98	0.77	1.07	0.75	10.13	9.07	12.23	9.14
3	0.76	0.74	0.76	0.57	9.58	10.94	10.42	8.26
Big	0.80	0.73	0.82	0.52	16.91	15.82	23.18	8.09
		γ				t(γ)		
Small	0.73	-0.41	0.64	0.58	3.21	-1.21	2.70	2.86
2	1.04	1.21	0.67	0.81	5.85	7.78	4.18	5.39
3	1.06	0.57	0.95	0.24	7.27	4.62	7.11	1.90
Big	0.17	0.08	0.09	-0.02	1.97	1.00	1.39	-0.15
		λ				t(λ)		
Small	0.72	1.14	0.31	0.54	3.35	3.57	1.40	2.81
2	0.42	0.68	0.24	0.28	2.50	4.61	1.59	1.95
3	0.14	0.49	0.31	0.64	1.05	4.22	2.48	5.38
Big	-0.24	0.42	0.02	0.38	-2.92	5.22	0.32	3.38
		ω				t(ω)		
Small	-0.54	-0.46	-0.10	-0.40	-2.44	-1.40	-0.45	-2.06
2	-0.27	-0.35	-0.72	-0.30	-1.60	-2.34	-4.65	-2.07
3	-0.21	-0.22	-0.38	-0.23	-1.47	-1.86	-2.94	-1.91
Big	0.02	-0.08	0.09	-0.02	0.19	-1.02	1.47	-0.17
		η				t(η)		
Small	-1.68	-3.42	0.00	-1.44	-12.69	-17.32	0.03	-12.14
2	0.03	-0.04	0.07	-0.70	0.30	-0.46	0.73	-8.05
3	-0.34	-0.33	0.08	-0.41	-4.00	-4.53	1.01	-5.61
Big	-0.25	-0.24	-0.12	-0.86	-4.87	-4.85	-3.05	-12.43
		ν				t(ν)		
Small	-0.16	0.06	-0.03	-0.48	-0.84	0.22	-0.17	-2.87
2	-0.78	-0.39	-0.39	-0.36	-5.38	-3.02	-2.97	-2.98
3	-0.22	0.06	0.07	0.05	-1.86	0.60	0.69	0.51
Big	-0.23	0.28	0.17	0.45	-3.25	4.10	3.26	4.65

Table 9: Regression Estimates for the 16 Size-Momentum Portfolios (Jan 1999-Dec 2014)

	Low	2	3	High	Low	2	3	High
		α				t(α)		
Small	-1.52	5.26	0.58	-0.97	-1.01	3.00	0.44	-0.66
2	2.00	1.34	2.56	-1.73	1.48	0.90	2.10	-1.03
3	7.38	1.49	1.59	0.41	7.12	2.13	1.80	0.37
Big	2.11	1.33	0.42	0.20	3.69	2.26	0.71	0.25
		β				t(β)		
Small	1.02	1.21	1.11	1.10	8.58	8.73	10.62	9.47
2	1.12	0.97	1.06	1.41	10.47	8.23	10.95	10.56
3	0.74	0.90	0.86	0.90	8.94	16.30	12.26	10.33
Big	0.85	0.97	0.77	0.79	18.67	20.76	16.60	12.32
		γ				t(γ)		
Small	0.57	0.70	1.00	0.94	2.61	2.75	5.24	4.41
2	1.24	1.27	0.64	0.86	6.29	5.86	3.60	3.50
3	-0.93	0.44	0.68	0.77	-6.16	4.37	5.26	4.80
Big	0.21	-0.01	0.15	0.09	2.48	-0.16	1.70	0.80
		λ				t(λ)		
Small	0.28	0.10	0.17	0.36	1.37	0.40	0.92	1.81
2	0.36	0.16	0.23	0.40	1.92	0.77	1.37	1.75
3	-0.53	0.28	0.24	0.26	-3.74	2.87	2.01	1.72
Big	-0.28	0.17	0.13	0.12	-3.55	2.05	1.58	1.08
		ω				t(ω)		
Small	-0.22	-1.07	-0.24	-0.19	-1.03	-4.35	-1.32	-0.94
2	-1.08	-0.59	-0.67	0.16	-5.67	-2.84	-3.91	0.70
3	-0.45	-0.31	-0.27	0.19	-3.07	-3.19	-2.16	1.19
Big	-0.07	0.03	0.11	0.30	-0.85	0.37	1.37	2.62
		η				t(η)		
Small	-0.07	-0.10	0.01	0.05	-0.59	-0.67	0.13	0.43
2	0.10	-0.01	-0.02	0.11	0.90	-0.09	-0.19	0.79
3	-0.44	0.02	0.15	0.08	-4.99	0.31	2.05	0.82
Big	-0.34	-0.07	0.02	-0.15	-6.94	-1.39	0.48	-2.21
		ν				t(ν)		
Small	-0.67	-0.70	-0.66	-0.56	-3.73	-3.34	-4.25	-3.21
2	-0.75	-0.40	-0.57	-1.12	-4.68	-2.28	-3.90	-5.60
3	0.07	-0.13	0.04	-0.06	0.59	-1.53	0.36	-0.45
Big	0.13	0.22	0.20	0.02	1.92	3.15	2.88	0.25

Table 10: Regression Estimates for the 16 Size-Yield Portfolios (Jan 1999-Dec 2014)

	Low	2	3	High	Low	2	3	High
		α				t(α)		
Small	3.73	-0.81	3.32	-1.33	2.71	-0.47	2.15	-1.13
2	-2.32	-3.09	-1.88	-5.72	-1.93	-2.05	-1.46	-2.46
3	-0.83	-0.98	-0.34	-2.26	-1.20	-1.02	-0.34	-1.73
Big	-2.13	0.19	1.01	3.74	-2.44	0.26	1.25	3.22
		β				t(β)		
Small	0.00	0.99	0.80	0.95	-0.05	7.16	6.57	10.16
2	0.95	0.67	0.79	1.54	9.94	5.61	7.77	8.34
3	0.64	0.63	1.08	0.51	11.60	8.35	13.43	4.89
Big	0.89	0.70	0.87	0.46	12.81	12.55	13.47	4.99
		γ				t(γ)		
Small	-0.34	-0.05	-0.03	0.25	-1.68	-0.19	-0.12	1.47
2	0.56	-0.09	0.42	0.57	3.21	-0.39	2.26	1.69
3	0.34	0.29	0.23	0.13	3.39	2.07	1.53	0.69
Big	0.07	-0.28	-0.32	-0.86	0.56	-2.71	-2.71	-5.07
		λ				t(λ)		
Small	0.31	-0.14	0.24	0.43	1.64	-0.58	1.13	2.65
2	0.35	0.49	0.35	0.22	2.12	2.35	1.97	0.69
3	0.33	0.25	0.18	0.69	3.47	1.92	1.27	3.83
Big	0.13	0.34	0.31	0.16	1.06	3.48	2.83	1.01
		ω				t(ω)		
Small	0.03	0.24	-0.33	-0.07	0.16	0.97	-1.51	-0.44
2	-0.17	-0.06	-0.20	0.26	-1.01	-0.27	-1.09	0.81
3	-0.19	-0.03	-0.07	-0.19	-1.93	-0.23	-0.51	-1.02
Big	0.22	0.10	0.04	-0.06	1.78	1.03	0.35	-0.39
		η				t(η)		
Small	-1.89	1.52	0.12	0.07	-16.20	10.30	0.91	0.72
2	1.10	-0.06	1.11	2.57	10.80	-0.50	10.14	13.02
3	0.37	0.06	0.12	-1.35	6.33	0.71	1.45	-12.20
Big	1.54	-0.33	0.20	-1.81	20.69	-5.55	2.92	-18.40
		ν				t(ν)		
Small	0.29	-0.47	-0.39	-0.42	1.75	-2.27	-2.10	-3.03
2	-0.57	-0.27	-0.64	-1.35	-3.95	-1.53	-4.16	-4.87
3	-0.12	0.02	-0.29	-0.01	-1.40	0.19	-2.41	-0.06
Big	-0.20	0.23	0.16	0.41	-1.93	2.68	1.64	2.98

Table 11: Regression Estimates for the 16 Size-Volatility Portfolios (Jan 1999-Dec 2014)

	Low	2	3	High	Low	2	3	High
		α				t(α)		
Small	-6.69	-2.48	3.36	4.80	-1.43	-0.55	1.09	1.51
2	1.52	3.50	5.03	1.64	0.74	1.74	2.22	0.73
3	5.86	3.68	2.14	-1.08	3.14	2.48	1.75	-0.33
Big	0.99	-0.09	-0.74	4.43	1.82	-0.13	-0.53	13.05
		β				t(β)		
Small	0.64	0.77	0.84	1.34	2.23	2.79	4.43	6.82
2	1.26	1.19	1.33	0.92	9.94	9.60	9.58	6.65
3	0.99	1.16	1.20	1.55	8.64	12.71	15.97	7.67
Big	0.86	1.08	1.11	-0.05	25.84	26.35	12.82	-2.52
		γ				t(γ)		
Small	-0.48	-0.09	0.72	0.42	-0.64	-0.13	1.45	0.81
2	0.24	0.75	0.40	0.55	0.73	2.32	1.09	1.50
3	0.69	0.45	0.34	-0.07	2.30	1.89	1.74	-0.13
Big	0.02	-0.18	0.30	0.09	0.27	-1.72	1.32	1.68
		λ				t(λ)		
Small	-0.62	-1.47	-1.49	-1.60	-0.45	-1.11	-1.64	-1.70
2	-0.57	-0.57	-0.83	-0.74	-0.94	-1.78	-1.24	-1.11
3	-1.37	-0.61	-0.45	-0.54	-2.48	-1.37	-1.25	-0.55
Big	0.16	0.16	0.33	0.10	0.97	0.82	0.79	0.96
		ω				t(ω)		
Small	2.80	2.01	-0.03	0.28	3.16	2.37	-0.06	0.46
2	0.52	-0.30	-0.30	-0.01	1.33	-0.78	-0.71	-0.01
3	-0.35	-0.26	-0.08	0.50	-0.98	-0.92	-0.35	0.81
Big	-0.18	0.10	-0.07	-0.22	-1.77	0.82	-0.25	-3.43
		η				t(η)		
Small	-1.54	-2.27	-1.19	-0.32	-2.34	-3.60	-2.75	-0.72
2	-0.32	0.48	0.38	-0.78	-1.10	1.68	1.19	-2.44
3	0.62	0.37	0.19	0.72	2.37	1.79	1.11	1.56
Big	0.12	-0.02	0.06	-0.18	1.57	-0.17	0.33	-3.84
		ν				t(ν)		
Small	-0.07	-0.47	-0.27	-0.77	-0.17	-1.20	-1.02	-2.77
2	-0.36	-0.29	-0.44	-0.65	-2.01	-1.67	-2.25	-3.29
3	-0.03	-0.16	-0.28	-0.74	-0.19	-1.24	-2.67	-2.60
Big	0.12	-0.02	-0.21	0.07	2.63	-0.40	-1.75	2.30

6. Conclusion

The Capital Market Authority has recently announced the opening of the Saudi stock exchange for qualified foreign investors. Starting from 15 June 2015, foreign investors will have the chance to invest in the largest stock market in the MENA region. From a foreign investor's standpoint, the Saudi stock market offers multiple diversification opportunities and great exposure to reviving industries. As shown in this paper, the Saudi stock market is positively correlated with oil prices, GCC markets, and other major markets including the S&P 500 and the New York Stock Exchange. The Saudi market is found to be negatively correlated with the U.S. dollar index and the volatility (fear) index. Thus, foreign investors may take advantage from these mixed correlations for hedging purposes.

Based on the multifactor model introduced by Cheung, Hoguet, and Ng (2014), this paper confirms the existence of significant factor premiums in the Saudi stock market. Specifically, the analysis of this paper found significant premiums to all factors under examinations (volatility, size, momentum, value, and dividend yield) in the Saudi stock exchange during the period from January 1999 to December 2014. The paper shows that riskier assets are not always rewarding in the Saudi market, as is the case for advance equity markets [see Baker and Haugen (2012)]. In this regard, opening up the Saudi stock exchange for qualified foreign investors is a key step to simultaneously increase the efficiency of and curb some of the existing anomalies in the Saudi stock market.

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