The Impact of Economic Risk Factors on Industry Stock Returns: An Empirical Investigation in the UAE Stock Market

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Abstract

This paper employs a multifactor pricing model to investigate the pricing of several local sources of risk factors and whether these factors explain the variation in the stock returns for the U. A. E. industries, and if so, to what extent. We examine returns of nine industries: banking, consumer staples, industrial, insurance, investment & financial service, real estates, service, telecommunication, and transportation for which data is available. Our results show that local sources of risk factors are very important in explaining the variations in the monthly excess return for the U. A. E. industries. Also, the local sources of risk factors and industry stock returns are found to be related. Local market excess return has major influence on industry returns for all industries investigated.

Keywords: Macroeconomic Factors, Returns, Local Risk, Multifactor Model

1 Introduction

Pricing of financial assets has intrigued researchers in finance for years. Early analysis was influenced by the dominant models within the single factor Capital Asset Pricing Model (CAPM) developed by Sharp (1964), Lintner, Black, Jensen, and Scholes, and Fama and McBeth (3, 8, 13). These models apply CAPM, which considers the market index to be the only relevant factor in measuring an asset’s systematic risk. Prognostication based around CAPM retains certain strengths, however many empirical studies on the very same also fail to provide evidence in favor of a clear relationship between return and market beta Fama and Fench found evidence of significant effects on asset returns originating from a set of microeconomic and company specific factors such as size and book-to-market ratio along with the market portfolio using their three-factor model (9).

Roll (1977), Roll and Ross (1980) and Chen, Roll and Ross, the founders of the Arbitrage Pricing Theory (APT), offered an alternative model to CAPM (4, 19, 20, 21). They hypothesized that macroeconomic factors are the only relevant factors that impact asset returns, but results from measuring these effects on return vary according to the set of macroeconomic factors observed. This variation in outcomes provides a motivation for further research by examining diverse stock markets under various time frames. The objective of this study is to identify and examine the extent to which key macroeconomic factors are reflected in the performance of stock returns in different industries. Specifically, two major research questions are posed. First, whether and to what extent do returns in industries respond to changes in macroeconomic risk factors? Second, is the impact on industry stock returns similar across industries?

The findings of this study are valuable for several reasons. First, the findings shed light on the effect of macroeconomic risk factors on industry returns. Second, the findings help investors and practitioners improve their understanding of the influence of risk on returns of different industries. Such information can help investors make informed decisions with respect to investment decisions e.g., allocating, timing, and diversifying portfolios. To the knowledge of the authors, such a study does not exist for the stock market in the United Arab Emirates (U.A.E).

This paper employs a multifactor pricing model to investigate industry stock returns. For our purpose, several local macroeconomic risk factors are constructed: exchange rate, export of goods, imports of goods, industrial production, inflation, money supply (M1), money supply (M2), oil prices, and composite market price. We examine returns of nine different U. A. E. industries (for which data is available): banking, consumer staples, industrial, insurance, investment &

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The relationship between risk factors and asset returns has been a subject of debate in the literature. Most of the studies employ different models to investigate the effect of different sets of local and global risk factors on the returns of either individual or portfolios of stocks regardless of industry type. Christopher Gan, Minsoo Lee, Hua Hwa AU Yong, and Jun Zhang employed cointegration tests such as the Johansen Maximum Likelihood and Granger-causality tests to investigate the relationships between the New Zealand Stock Index and a set of macroeconomic variables from January 1990 to January 2003 (5). Specifically, they tried to determine whether the New Zealand Stock Index is a leading indicator for macroeconomic variables. Using innovation accounting analyses, the paper also investigates the short run dynamic linkages between NZSE40 and macroeconomic variables. The authors found that the NZSE40 is consistently determined by the interest rate, money supply and real GDP. Weak evidences that the New Zealand Stock Index is a leading indicator for changes in macroeconomic variables were found. 

Orawan Ratanapakorn and Subhash C. Sharma used the Granger causality test to investigate the long-term and short-term relationships between the US stock price index (S&P 500) and several macroeconomic variables over the period 1975:1–1999:4. Interestingly, the authors observe that the stock prices negatively relate to the long-term interest rate. On the other hand, a positive relationship between stock prices and money supply, industrial production, inflation, the exchange rate and the short-term interest rate was found. Stock prices were found to be impacted by the macroeconomic variables in the long-run but not the short-run according to the Granger causality sense (17).

Serkan Yilmaz Kandir used annual data from July 1997 to June 2005 to study the relationship between macroeconomic factors and stock returns in Turkey (22). A set of Macroeconomic variables that is consistent with financial theory and economic intuition was chosen. The economic variables are the growth rate of industrial production index, change in consumer price index, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil price and return on the MSCI World Equity Index. The authors designed a multiple regression model to test the relationship. Except for the inflation, all of the portfolio returns seem to be affected by the exchange rate, interest rate and world market return, while inflation rate is significant for only three of the twelve portfolios. No relationships between the stock returns and industrial production, money supply and oil prices were found.

Khaled Hussainy and Le Khanh Ngoc used monthly time series data from Vietnamese stock market and covered the period from January 2001 to April 2008 to investigate the effects of macroeconomic variables such as the interest rate and the industrial production on Vietnamese stock prices (12). The authors also examined how US macroeconomic variables affect Vietnamese stock prices. The study found significant relationships among the domestic production sector, money markets, and stock prices in Viet Nam. Surprisingly, a significant relationship between the US macroeconomic fundamentals and the Vietnamese stock prices was found. Finally, the results show that the influence of the US real sector is stronger than that of the money market.

Donatas Pilinkus investigated the relationship between several macroeconomic factors and the main Baltic stock market indices as an attempt to present a model of the impact of macroeconomic factors on stock market index, and to determine what macroeconomic factors that have impact on stock market index in the short and long runs (6). The data used are monthly and extend from the January of 2000 to the December of 2008. The Baltic States included in the study are Lithuania, Latvia, and Estonia. They discovered different relationships between macroeconomic factors and stock market indices in each market with varying impact.

Using Nigeria stock market data from 1985 to 2009, Anthony Olugbenga Adaramola investigate the impact of macroeconomic indicators on stock prices in Nigeria. A panel model was used to examine the impact of macroeconomic variables on stock prices of the selected firms in Nigeria (1). A set of macroeconomic variables was used for the analysis. The macroeconomic variables used are: money supply, interest rate, exchange rate, inflation rate, oil price, and gross domestic product. The study revealed that macro-economic variables have varying significant impact on stock prices of individual firms in Nigeria. Except for inflation rate and money supply, all the other macroeconomic variables have significant impacts on stock prices in Nigeria. Finally, the study concluded with empirical evidences that changes in macroeconomic variables can be used to predict changes of stock prices in Nigeria.

Using the vector autoregression Model, M. N. Khan, N. Tantisantiwong, S. G. M. Fifield, and D. M. Power investigate whether economic variables have explanatory power for share returns in four South Asian stock markets, namely, Bangladeshi, Indian, Pakistani, and Sri Lankan (16). The data covers the period 1998–2012, the study examines the influence of a selection of local, regional and global economic variables in explaining equity returns. The South Asian markets examined are found to be not efficient. Both local and regional factors can directly and indirectly explain Bangladeshi, Pakistani and Sri Lankan stock returns while the lagged returns of the Pakistani stock market and world economic activity can explain Indian stock returns.

A cross section data that cover six different countries was used by Jordan French to test five macroeconomic variables that have been both theorized to affect stock returns and been proven to do so in past empirical research (11). The study different analytical methodologies to test the relationships such as principle component regression, cross section regression, and factor analysis. The economic variables chosen are risk premium, industrial production, term structure, expected inflation, and unexpected inflation. Some economic variables were found to have an impact on the stock returns while others are not in the countries studied. For example, risk premium and industrial production were significant over the sample, but term structure, expected inflation, and unexpected inflation were not significant in explaining domestic market returns. Furthermore, principal component regressions outperformed cross-sectional ones, with factor analysis as the least statistically significant model. Not surprisingly, the
arbitrage pricing theory was also found to be a less robust pricing tool than the capital asset pricing model.

3 Methodology and Data Analysis

3.1 Methodology

According to Arbitrage Pricing Theory, asset returns are sensitive to unexpected change in several macroeconomic factors. Under this assumption, some research used unexpected components of macroeconomic factors. This method requires a measure to represent the unanticipated component of the macroeconomic factors in the actual time series. We use the ARIMA model for that purpose. The expected values as represented by ARIMA are subtracted from the actual values to calculate the unexpected component of the macroeconomic factors. To examine the effects risk factors have on the returns of the nine different industries being investigated, we employ a multifactor pricing model for the U. A. E data. Eq. (1) provides the framework for implementing that relationship. It models industry stock returns as a function of K-macroeconomic risk factors.

\[
R_{it} = \alpha_i + \sum_{j=1}^{k} \beta_{ij} F_{jt} + \varepsilon_{it}
\]

and,

\[
r_i = R_t - R_f
\]

where,

- \( R_{it} \) = the excess return
- \( R_t \) = the return for industry \( i \) at time \( t \)
- \( R_f \) = risk free interest rate
- \( \alpha_i \) = the constant term
- \( \beta_{ij} \) = the betas of the \( r_i \) on the \( k \) risk factors
- \( F_{jt} \) = the risk factors where \( j = 1 \ldots k \)
- \( \varepsilon_{it} \) = the error term representing the non-systematic excess return relative to risk factors

The \( k \) risk factors chosen in this study include exchange rate, export of goods, imports of goods, industrial production, inflation, money supply (M1), money supply (M2), oil prices, and composite market price.

3.2 Data: Description and Sources

3.2.1 Definition of data sets and the sample period

The data is divided into two sets. The first set includes industry stock returns of the U. A. E. stock market on a monthly basis. The second set consists of monthly macroeconomic factors. All monthly data is from May 2003 thru May 2018.

3.2.2 Industry Stock Returns

The industry indices chosen in this study come from the Securities and Commodities Authorities (SCA). We examine stock returns of nine different industries for which data is available in the U. A. E. The industries are banking, consumer staples, industrial, insurance, investment & financial service, real estates, service, telecommunication, and transportation. Industry stock returns, \( R_{it} \), are calculated for each industry index, as:

\[
R_{it} = \ln\left[ \frac{R_{it}}{R_{i,t-1}} \right]
\]

where, \( R_{it} \) and \( R_{i,t-1} \) are the index values of industry \( i \) at time \( t \) and \( t - 1 \) respectively, in local currency. We choose the broadest index available to provide a long-term series that shows the overall trend of stocks in the U. A. E. The industry stock returns (\( R_{it} \)) are in excess of the local short-term interest rate in the U. A. E. We used the U. S. A. 3-month Treasury Bill (ITUSA3D) as a proxy for the short-term interest rate in the U. A. E. the U. S. A. 3-month Treasury Bill serve as the risk-free (\( R_f \)) rate and is used to measure excess returns for each industry.

3.2.3 Local Macroeconomic Risk Factors

Table 1 presents a list of factors used in different studies within APT framework. The choice of macroeconomic factors was dictated by each factor’s theoretical relevance to asset pricing, regardless of the location of the market. Additionally, data availability on monthly frequency was also a consideration. Each factor starts in May 2003. Based on the above approach, we selected a set of macroeconomic factors that explain the variation on the industry stock returns. These factors are exchange rate, export of goods, imports of goods, industrial production, inflation, money supply (M1), money supply (M2), oil prices, and composite market price.

Foreign Exchange Rate: Foreign exchange rate is measured as the change from month \( t - 1 \) to month \( t \) in the natural logarithm of foreign currency exchanges of the U. A. E. The following equation is used

\[
FX_t = \ln\left[ \frac{FX_t}{FX_{t-1}} \right]
\]

The series was obtained from Global Financial Data (GFD) for the period 5/2003 thru 5/ 2018.

Export of Goods: Export of goods is measured as the change from month \( t - 1 \) to month \( t \) in the natural logarithm of export of goods of the U. A. E. The following equation is used:

\[
EG_t = \ln\left[ \frac{EG_t}{EG_{t-1}} \right]
\]

The series was obtained from GFD for the period 5/2003 thru 5/ 2018.

Imports of Goods: Import of goods is measured as the change from month \( t - 1 \) to month \( t \) in the natural logarithm of import of goods of the U. A. E. The equation (5) is used.

Table 1: Macroeconomic factors utilized in previous studies

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX</td>
<td>Foreign Exchange Rate</td>
</tr>
<tr>
<td>EG</td>
<td>Export of Goods</td>
</tr>
<tr>
<td>IG</td>
<td>Import of Goods</td>
</tr>
<tr>
<td>M1</td>
<td>Money Supply (M1)</td>
</tr>
<tr>
<td>M2</td>
<td>Money Supply (M2)</td>
</tr>
<tr>
<td>IP</td>
<td>Industrial Production</td>
</tr>
<tr>
<td>IN</td>
<td>Inflation</td>
</tr>
<tr>
<td>PS</td>
<td>Price Stability</td>
</tr>
<tr>
<td>OIL</td>
<td>Oil Prices</td>
</tr>
<tr>
<td>COM</td>
<td>Composite Market Price</td>
</tr>
</tbody>
</table>
The series was obtained from GFD for the period 5/2003 thru 5/2018.

\[ IG_t = \ln\left[ \frac{IG_t}{IG_{t-1}} \right] \]  \hspace{1cm} (5)

The series was obtained from GFD for the period 5/2003 thru 5/2018.

\[ IP_t = \ln\left[ \frac{IP_t}{IP_{t-1}} \right] \]  \hspace{1cm} (6)

The series was obtained from GFD for the period 5/2003 thru 5/2018.

\[ l_t = \ln\left[ \frac{P_t}{P_{t-1}} \right] \]  \hspace{1cm} (7)

where, \( P_t \) and \( P_{t-1} \) are prices at time \( t \) and \( t-1 \). The consumer price index was obtained from GFD. The inflation series is for the period 5/2003 thru 5/2018.

\[ M_{1,t} = \ln\left[ \frac{M_{1,t}}{M_{1,t-1}} \right] \]  \hspace{1cm} (8)

The series was obtained from GFD for the period 5/2003 thru 5/2018.
Money Stock (M2): Money stock (M2) is measured as the change from month \( t-1 \) to month \( t \) in the natural logarithm of money stock (M2) of the U. A. E. The following equation is used

\[
M_{2,t} = \ln\left[\frac{M_{2,t}}{M_{2,t-1}}\right] \tag{9}
\]

The series was obtained from GFD for the period 5/2003 thru 5/ 2018.

Oil Prices (OG): Oil prices are included as a systematic risk factor influencing equity markets. Chen et al use the producer price index / crude petroleum as an approximation of oil prices in the U.S markets (4), and Hamao uses the Arabian Light Spot prices in Japanese equity markets. We use Dubai Arab Light Crude Oil index (10). The oil price growth factor (OG) is constructed as the realized monthly first difference in the logarithm of Dubai Arab Light Crude Oil index using the equation below:

\[
OG_{t} = \ln\left[\frac{OG_{t}}{OG_{t-1}}\right] \tag{10}
\]

where Oil \( t \), Oil \( t-1 \) are oil prices at time \( t \) and \( t-1 \) respectively. The series was obtained from GFD for the period 5/2003 thru 5/ 2018.

Market Index: Asset pricing models usually accommodate a role for a market portfolio to measure risk and to capture all the information available to the market, not captured by the non-equity economic factors. The return on the market portfolio is defined as the monthly first difference in the logarithm of the national equity market portfolio using the following equation;

\[
R_{mt} = \ln\left[\frac{R_{mt}}{R_{m,t-1}}\right] \tag{11}
\]

\( R_{m,t} \) and \( R_{m,t-1} \) are the return values of the market at time \( t \) and \( t-1 \), respectively, in local currency. We use the most common but readily available stock return index. The series for the U.A.E stock market portfolio is obtained from SCA. The series covers the period from 5/2003 thru 5/ 2018.

The market return portfolios (\( R_{m,t} \)) are in excess of local short-term interest rates. The latter is used as a proxy for the risk-free rate (\( R_{f} \)) to measure excess returns for the market portfolio. The short-term interest rate refers to the 3-month Treasury Bill. We used the U. S. A. 3-month Treasury Bill (ITUSA3D) as a proxy for the short-term interest rate in the U. A. E.

4 Empirical Results

This section of the paper presents the effects of risk factors on local industry returns in the U. A. E by estimating equation one using the OLS (Ordinary-Least Squares) regression method.

4.1 Industry Returns and Risk Factors

After choosing the best ARMA model for each macroeconomic risk factor, we subtracted the fitted values from the actual values to form the unexpected components of the series. The new variables thus created are unexpected measures for exchange rate, export of goods, imports of goods, industrial production, inflation, money supply (M1), money supply (M2), oil prices and local Market Index. After deriving new measurements for local macroeconomic risk factors, their influences on the stock price indices for all nine industries were estimated and tested. OLS was applied to estimate Equation 1 over the sample period.

Table 2 presents descriptive statistics for the U. A. E market index and macroeconomic risk factors for the period 5/2003 thru 5/2018. Table 2 shows that the unexpected inflation bears the highest risk, while the unexpected exchange rate bears the lowest level of risk as approximated by standard deviation. Skewness statistics show that unexpected import of goods, unexpected inflation, unexpected stock supply (M1), unexpected stock supply (M2) and unexpected oil prices are positively skewed with the highest positive skewness found in unexpected money stock (2) and the lowest in unexpected oil prices. The negatively skewed factors are unexpected exchange rates, unexpected export of goods, unexpected industrial production, and the local market index. The highest negative skewness found in the unexpected exchange rates and the lowest in local market index. The Jarque-Bera statistics indicate that every unexpected macroeconomic risk factor exhibits significant departure from normality, therefore, the null hypothesis of normal distribution for those macroeconomic series is rejected at the 1% level of significance. The abnormality can be attributed to the existence of large numbers both positive and negative within the sample period. The ADF statistics show that all of the unexpected macroeconomic risk factors are stationary (series are all I(0)). The null hypothesis of a unit root is rejected at the 1% level.

Table 3 presents the correlation matrix for the U.A.E monthly market index and unexpected macroeconomic risk factors. As reported, a mild correlation exists among the unexpected macroeconomic factors in the U.A.E. The highest correlation is found between unexpected money stock (M1) and unexpected money stock (M2). The results also suggest that the factors do not have any meaningful indication of multicollinearity. Table 4 reports reactions of industrial stock returns to several local macroeconomic risk factors for the U.A.E over the period of 5/2003 thru 5/2018. The results show that the market index in the U.A.E (MKT) has a significant positive effect in every relevant industry. Moreover, the most sensitive industry to the market index is the real estate industry with a market beta coefficient of 1.3154 and \( t=41.274 \), while the consumer staples industry is considered the least sensitive to the market index with a market beta coefficient of 0.2172 and \( t=3.6537 \), both at the 1% level of significance. With regard to the macroeconomic risk factors, some important relationships have been found. The investment & financial service industry has been found to be the most sensitive industry to changes in macroeconomic factors during the sample period.
Table 2: Summary Statistics for the U. A. E Market Index and Macroeconomic Factors (May 2003 to May 2018)

<table>
<thead>
<tr>
<th>Correlation</th>
<th>UFX</th>
<th>UEG</th>
<th>UIG</th>
<th>UIP</th>
<th>UI</th>
<th>UM1</th>
<th>UM2</th>
<th>UOG</th>
<th>MKT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.02E-08</td>
<td>-2.29E-05</td>
<td>2.86E-05</td>
<td>1.91E-05</td>
<td>-0.000519</td>
<td>-3.55E-05</td>
<td>-2.46E-05</td>
<td>-8.43E-06</td>
<td>-0.009014</td>
</tr>
<tr>
<td>Median</td>
<td>2.32E-06</td>
<td>-0.002744</td>
<td>-3.95E-05</td>
<td>4.24E-05</td>
<td>-0.041448</td>
<td>-0.003481</td>
<td>-0.003136</td>
<td>0.002604</td>
<td>-0.006794</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.000383</td>
<td>0.077976</td>
<td>0.014765</td>
<td>0.005636</td>
<td>1.655444</td>
<td>0.465429</td>
<td>0.463609</td>
<td>0.141301</td>
<td>0.122602</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.001308</td>
<td>-0.140907</td>
<td>-0.007507</td>
<td>-0.005016</td>
<td>-1.109310</td>
<td>-0.075183</td>
<td>-0.051503</td>
<td>-0.115256</td>
<td>-0.175460</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.000129</td>
<td>0.022885</td>
<td>0.002989</td>
<td>0.001628</td>
<td>0.333008</td>
<td>0.037987</td>
<td>0.036255</td>
<td>0.036358</td>
<td>0.044720</td>
</tr>
<tr>
<td>Skewness</td>
<td>-8.628826</td>
<td>-1.069123</td>
<td>0.850106</td>
<td>-0.214331</td>
<td>0.610976</td>
<td>10.24494</td>
<td>11.63312</td>
<td>0.020193</td>
<td>-0.319267</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>79328.13</td>
<td>527.1035</td>
<td>97.14510</td>
<td>12.10493</td>
<td>151.1403</td>
<td>117588.9</td>
<td>165826.6</td>
<td>20.914274</td>
<td>14.72306</td>
</tr>
<tr>
<td>Probability</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.002353</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000029</td>
<td>0.000635</td>
</tr>
</tbody>
</table>

Table 3: Correlation Matrix for the U. A. E Market Index and Macroeconomic Factors (May 2003 to May 2018)

<table>
<thead>
<tr>
<th>Correlation</th>
<th>UFX</th>
<th>UEG</th>
<th>UIG</th>
<th>UIP</th>
<th>UI</th>
<th>UM1</th>
<th>UM2</th>
<th>UOG</th>
<th>MKT</th>
</tr>
</thead>
<tbody>
<tr>
<td>UFX</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UEG</td>
<td>-0.069146</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UIG</td>
<td>-0.023122</td>
<td>-0.049245</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UIP</td>
<td>0.245501</td>
<td>0.185461</td>
<td>0.150903</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UI</td>
<td>-0.189518</td>
<td>0.241234</td>
<td>0.012987</td>
<td>0.023538</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UM1</td>
<td>0.055098</td>
<td>0.085188</td>
<td>-0.029051</td>
<td>0.084699</td>
<td>0.061127</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UM2</td>
<td>0.055158</td>
<td>0.027636</td>
<td>-0.010193</td>
<td>0.074144</td>
<td>0.051541</td>
<td>0.964780</td>
<td>1.000000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UOG</td>
<td>-0.029647</td>
<td>-0.013231</td>
<td>-0.046796</td>
<td>0.024693</td>
<td>0.076491</td>
<td>-0.001764</td>
<td>0.013168</td>
<td>1.000000</td>
<td></td>
</tr>
<tr>
<td>MKT</td>
<td>-0.026323</td>
<td>0.247767</td>
<td>0.017858</td>
<td>0.196961</td>
<td>0.072108</td>
<td>0.042479</td>
<td>0.010449</td>
<td>0.091247</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Note: The ADF Test is an augmented Dickey-Fuller Unit Root Test. The ADF test is a stationary test. The critical values for ADF test are −2.5677, 2.8632, and −3.4359 for significant levels of 10%, 5%, and 1% respectively. * ** *** Denote significance at 10%, 5%, and 1% level, respectively.

Table: 4 shows the powerful effect of the local market index on each of the nine industries with some reasonable effects.

The unexpected foreign exchange (UFX), the unexpected import of goods (UIG), the unexpected money stock (M1), and the unexpected oil prices are not found to have any significant association with any industry in the U.A.E. However, the same cannot be said about the other economic factors. Unexpected export of goods (UEG) has a negative effect on the banking industry (-0.1082) at the 10% level of significance while has a positive effect on investment & financial service industry (0.1559) (2.6656) at the 10% level of significance. Both Unexpected inflation (UI) and the unexpected industrial production (UIP) are found to have significant negative effects on the investment & financial service industry (-0.0129) (-2.6137), (-2.6266) (-2.5812) for the same sample period. In the case of the unexpected money stock (UM2), the consumer staples industry was the only industry to be affected by that factor with a coefficient value of -0.7652 and t= -2.8125 at the 5% level of significance. R² for the nine estimated regressions in the U.A.E. are reasonable, which implies that most variations in the industry returns are explained by the local market index in addition to the local macroeconomic risk factors. DW is very close to 2 therefore the serial correlation problem is ignored. For the purpose of completeness, figure 1 shows movements of the monthly returns of the U. A. E. industry indices over the period of May 2003 thru May 2018, while figure 2 shows movement of the U.A.E. monthly macroeconomic risk factors over the same period.

Generally, the regression results in the U.A.E. as reported in table 4, show the powerful effect of the local market index on each of the nine industries with some reasonable effects.
regarding the local macroeconomic factors such as UEG, UIP, UI and UM2.
Figure 1: Measuring Movement of the Monthly Returns of the U.A. E. industries indices (May 2003 to May 2018)
### Figure 2: Movement of the U. A. E. Monthly Unexpected Macroeconomic Factors (May 2003 to May 2018)

### Table 4: Industrial Stock Returns Reactions to Macroeconomic Risk Factors for the U. A. E. (May 2005 to May 2018)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Constant</th>
<th>UFX</th>
<th>UEG</th>
<th>UIG</th>
<th>UIP</th>
<th>UI</th>
<th>UM1</th>
<th>UM2</th>
<th>UOG</th>
<th>MKT</th>
<th>N</th>
<th>R² adj</th>
<th>DW</th>
<th>R² MKT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banking</td>
<td>-0.0022</td>
<td>0.9387</td>
<td>0.1082</td>
<td>0.6967</td>
<td>0.8271</td>
<td>-0.0028</td>
<td>0.0624</td>
<td>-0.0015</td>
<td>-0.1389</td>
<td>0.0007</td>
<td>18</td>
<td>0.869</td>
<td>5</td>
<td>1.9256</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>0.0104</td>
<td>-0.1520</td>
<td>0.2885</td>
<td>0.0009</td>
<td>-0.0046</td>
<td>0.3565</td>
<td>0.7652</td>
<td>-0.1122</td>
<td>0.2172</td>
<td>18</td>
<td>0.197</td>
<td>2</td>
<td>1.4735</td>
<td></td>
</tr>
<tr>
<td>Industrials</td>
<td>-0.0107</td>
<td>25.555</td>
<td>0.5998</td>
<td>2.2371</td>
<td>0.0028</td>
<td>0.6248</td>
<td>0.7200</td>
<td>0.0316</td>
<td>0.3650</td>
<td>18</td>
<td>0.099</td>
<td>5</td>
<td>2.2899</td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>-0.0007</td>
<td>36.548</td>
<td>0.0944</td>
<td>1.4267</td>
<td>-0.0047</td>
<td>0.1161</td>
<td>0.1167</td>
<td>0.5037</td>
<td>0.5037</td>
<td>18</td>
<td>0.049</td>
<td>0</td>
<td>2.0593</td>
<td></td>
</tr>
<tr>
<td>Investment &amp; Financial Service</td>
<td>0.0015</td>
<td>-9.5824</td>
<td>0.1114</td>
<td>2.6266</td>
<td>-0.0129</td>
<td>0.1932</td>
<td>0.1978</td>
<td>0.1145</td>
<td>0.847</td>
<td>18</td>
<td>0.857</td>
<td>8</td>
<td>1.9239</td>
<td></td>
</tr>
<tr>
<td>Real Estate</td>
<td>0.0042</td>
<td>-4.8953</td>
<td>0.0860</td>
<td>0.0503</td>
<td>-0.0221</td>
<td>-0.0400</td>
<td>0.0158</td>
<td>0.3154</td>
<td>18</td>
<td>0.914</td>
<td>5</td>
<td>1.8804</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>0.0031</td>
<td>10.689</td>
<td>0.1570</td>
<td>1.6880</td>
<td>-0.1118</td>
<td>-0.2212</td>
<td>0.0212</td>
<td>0.108</td>
<td>0.516</td>
<td>18</td>
<td>0.516</td>
<td>8</td>
<td>1.7307</td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in parentheses indicate statistical significance.

- **:** p < 0.1
- ***: p < 0.05
- ****: p < 0.01
- *****: p < 0.001
5 Discussion and Conclusions

This paper examines the domestic sources of risk as an explanation of the variation in the industries’ stock returns and if so to what extent. The results show that local risk factors have reasonable explanatory power in accounting for the differences in industry excess returns on a monthly basis. The factors explained between 04% and 91% of the variations for the U. A. E. market over the sample period. We compared the illustrative powers of the local market, where the excess return is the only explanatory factor, with that of the multifactor model. Results suggest that market excess return is the most important explanatory factor among domestic risk factors. Any variation in the market excess return directly affects industry stock returns. Adding macroeconomic factors increases the explanatory power of the models. Investment & financial service, consumer staples, and banking are among the most sensitive industries in the U.A. E. In terms of allocating, timing, and diversifying investment portfolios from a policy perspective, the significant relationship between risk factors and industry stock returns is critical information for investors and practitioners seeking to better understanding how and to what extent risk factors effect returns by industry.

References