

Evaluation The Efficiency And Effectiveness of The Iraq stock Exchange -An Empirical Study From July 2004 to March 2008-

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Abstract

The aim of this study was to provide an overall assessment to the efficiency of the Iraq stocks exchanges (ISE) through specifying well –known models .First, Fama's efficient market hypothesis as a contrary concept to the random walk hypothesis, was performed and it has been found that ISE follows the random process, so the price of the shares can't be predicated on the basis of past information. Second,we use a multifactor model, which so named multiple regression, to explore the link between ISE and the main economic indicators. our empirical analysis finds that every weak associations exists between major ISE measures and main economic indicators.

المستخلص

تهدف هذه الدراسة لإعطاء تقييم شامل لكفاءة سوق العراق للأوراق المالية من خلال استخدام نماذج التقييم المعروفة حيث استخدم نموذج السوق الكفاءة لفاما- كمفهوم مناقض لفرضية السير العشوائي- لقياس كفاءة السوق الذي وجد أن حركته عشوائية ولا يمكن توقع أسعار الأسهم على أساس المعلومات الماضية. فيما استخدم نموذج العوامل المتعددة والمسمى أيضا الانحدار المتعدد لاستكشاف العلاقة بين مقاييس السوق والمؤشرات الاقتصادية الرئيسية حيث اظهر التحليل التطبيقي ترابط ضعيف جداً بين مقاييس السوق وتلك المؤشرات.



1. Introduction

In most countries, A well developed financial market (DFMs) play a key role in the economic growth and developing process due to their capacity to effectively acquire and process information about the innovative activities of investors and thereby to fund the most promising projects.

The finance literature has found that firms in countries with well DFM find it easier to attract long-term financing for their investment needs (claessens and laeven:2001:2). Also, DFM allow the efficient transfer of funds between borrowers and lenders .Individuals who have insufficient wealth to take advantage of all their investment opportunities which yield rates of return higher than the market rate are able to borrow funds and invest more than they would without capital markets, this follows from the fact that the (DFM) facilitate the transfer of funds between lenders and borrowers .As a result, DFM can give early signals to policy makers about expected changes in the economic activities . since DFM are expected to respond immediately to such changes .The study is organized as follows :section 2 describes the methodology, section 3 presents the theoretical background. in the section 3 we derive the empirical results and section 4 concludes and recommendations.

2. Methodology

2-1 the purpose of the study

This study is an attempt to examine whether the Iraqi stock exchange (ISE thereafter) exhibits any form of efficiency .Another goal is to establish a link between ISE raw indicators and some economic indicators because such a relationship will enable us to conclude whether ISE is affected by economic fluctuations, therefore we can benifits from this property by far as a base for economic policy actions .

2-2 the importance of the study

- 1- This study represents simple attempts to appliance the efficient markets hypothesis (EMFs) in the ISE's, at that ,test whether this market explore some kind of efficiency.
- 2- Provide an overall assessment for the effectiveness of ISE's and show the explicit and implicit effects on the Iraqi economy .
- 3- From the standpoint of an investors ,the risk of each domestic market can be characterized by a number of betas that represent the sensitivity to changes in a number of economic factors such as average interest rates ,inflation, growth rates of money supply and gross national product. In turn ,this study takes over by measure these betas to help the investors in risk management by the ISEs.



2-3 Data source and limitations .

This paper utilizes the data published by ISEs. (www.ISX-iq-net) in its statistical data and annual reports, in addition to monetary and financial indicators published by statistical & Research Department in the central Bank of Iraq ,(Annual Bulletines),Also its web-site(www.cbiraq.org) (key financial). By reason of the wars of disastrous saddam and the violence in Iraq, we found lack of integration in the time series period – specifically in the first years that followed ISE's establishment- and the year of 2003(excluded from the study) so ,quarterly times serios data from July 2004 to march 2008 will be used in order to allow for more reliable estimates and analysies .

2-4 Sample description

ISE's contains data on 7 sectors but not all are included in the sample . Three sectores are excluded because of insufficient prices history and less frequently traded issues .In other word there are occasional "gaps" in the time series of firm characteristics used to form sectors such as the firms of insurance and investment sector .Table 1-A presents summary statistics for the sectors in ISE's. The first column is the number of the sector whereas the second represents the name of the sector . The third column shows the average number of the firms in each one and the last column calculate the percent of the firms in any sector relative to the market as a whole .

Table 1-A

Summary statistics of the sectors in ISE's

No	Sector name	No. of firms	Percent
1	Banks sector	17	0.22
2	Services sector	12	0.15
3	Industrial sector	19	0.25
4	Tourism & Hotels sector	10	0.13

Source: Iraqi stock exchange, various monthly bulletins, 2007

2-5 Variables and measurement

We can summarize the variables as follow :

- 1- Independent variables :Inflation rate (INFR), the grow rate of real money supply (RMS),real gross national product (RGNP).
- 2- Dependent variables :the average price per share(P),the number of stocks traded in every sector (NS) and total volume traded (TVT).

2-6 Statistical tools used to process the data .

The data was processed by using some of statistical tools such as the autocorrelation function , multi- regression , coefficient of determination (R^2), Durbin Watson ,(D-W) .



2-7 The problem of the study

The study tried to answer the following specific questions :

- 1- How efficient is ISE's? are security prices reflect all available public information about the economy and the specific company involved, can anyone ,consistently " Beat the market"?
- 2- Are there controversial causality between the ISE's indicators and the economic status?
- 3- Can we rely on ISE's as early signals and indicators?

2-8 Hypotheses

- 1- H1: The ISE fully reflect all available ,relevant information .
- 2- H1: There are high relationship between major ISE measures and main real economic indicators.

2-9 Assumption

- 1.The law of one price suggest that equivalent stocks in ISE's must be traded at the same price.
2. The government of Iraq removing barriers and providing easier access to ISE's to be free market.
- 3.On any given trading day, all the investors receive at the same time new information from the companies and the market's status.

2-10 Previous studies

There have been numerous studies searched out all the facts of financial markets in search of the efficiency or effectiveness . In pertaining of efficiency, (fama,1970:383-417), (Lori et al,1985:177) (Easley and 'hara,1987:69-90), (Olesya etal,2002:1-34), in the local context (Al-janabi ,2005:136-145) (muhhamed,2008:112) but ,and no matter what method is used to measure the efficiency, obviously all these studies have used the general index of the market as a whole. Because of this approach ignores the differences among the stocks in various sectors in any market and may be provides mistiness results . This study takes into account these differences by using autocorrelation coefficient of stock prices at the level of the sectors instead of the market index.

As with efficiency , there have been numerous academic studies looks at the effectiveness process (or the comovement of stock prices and real economic activity) Schumpeter, 1911 stressed the role stock markets in an accelerator of economic and he argued that the financial services are very important for economic growth (Fatma , 2000 :1-15).

Relatedly ,(Gregorio,1998:1-33) based on regression analysis for large cross-sections of countries. In the sample, 48 out of the 69 countries he found that stock market affects economic growth directly which mean that its stock markets are effectual.(Klaus and Maurice,1999:1-23)investigated the causality relationship between the price stock and the macroeconomic factors by using Grangerlin model .Their empirical analysis reveals that the financial sector increases liquidity of investment and thus accelerate the economic growth.



In the model of Harvey, the sensitivity to economic factors such as foreign exchange ,commodity prices,world business cycle and inflation have had dramatic influence on the securities that trade in the local market (Harvey,1999:21).In the study constructed by Cirano,2000:1-14 logistic models are used to estimate the coefficients associated with a set of independent variables likely to explain (or predict) the hyper- return periods for the stock markets. The general logistic model as follows:-

$$L_i = \beta_1 + \beta_2 \Delta INF + \beta_3 \Delta GDP + \beta_4 \Delta ROE + \beta_5 P/E + \beta_6 P/\beta$$

• Where L_i is dependent variable refer to stock price , ΔINF , ΔGDP and ΔROE stand for the annual relative change in the inflation rate ,in the gross Domestic Product and the rate of return on equity of listed companies in the market, respectively. P/E and P/β refer to the price/ Earnings and price/Book ratio respectively .

The researcher found evidence that macroeconomic indicators have strongest impact on stock market returns, while (Tuuli,2002) conclude that macroeconomic factors has limited effects on prices of stocks in less developed countries(LDC's) than developed stock markets (Tuuli,2002:20-22).

This research presents new evidence on the effects of main real economic indicators. Although the results are weak, the evidence suggests that there is indeed a positive relationship between to the major ISE measures and economic indicators .

3-Theoretical background

3-1 The efficiency of the market.

An efficient stock markets, current market prices fully reflect information and it is impossible to outperform the market consistently, except by luck ,so , the measure of efficiency is seen in the extent and speed with which the market reflects new information in the share price (Richard and Bill,1999:44).

From the standpoint of Grinblatt and Titman ,stock markets are informationally efficient if the prices of publicly traded stock rationally reflect all publicly available information. (Grinblatt and Titman,1998:94).

From the outlook of Corrado and Jordan the debate regarding market efficiency has raged for several decades now, and it shows little sign of abating. The central issue is simple enough :can you, or can anyone, consistently "beat the market"? , if the answer to this question is(no) then the market is said to be (efficient)⁽¹⁾.(Corrado and Jordan,2000:217) ..If the market is efficient, share's prices reflects all available public information about the economy, financial market, and the specific company involved (Van Horn,2004:49),finally ,market efficiency, may exist at three levels or forms :(Bodie et al,2005:373).

- 1- The weak –form for the financial market efficiency.
- 2- The semistrong-form for the financial market efficiency.
- 3- The strong –form for the financial market efficiency.



- 4- hypothesis states that current market prices reflect not only all past price movements ,but all publicly available information .
- 5- The strong- form states that stock prices reflect all relevant information – even including information available only to company insiders.
- (1) If this is not the case, in other words,if the answer is (yes) arbitrage opportunities arise because alaw of one price suggests that equivalent securities must be traded at the same price whereby,in this case, the trader can buy a security and simultaneously sell it at a higher price, as a result ,making a profit (abnormal return) without in curring any risk, in an efficient market, arbitrage activity will continue until the price differential is eliminated. (for more details about arbitrage theory see (Solnik,2000:279-281).

3-2 The effectiveness of the market

The effectiveness issue is the most controversial and intriguing in investment. After the fashion of "Efficiency" effectiveness means that the variations in stock prices can reflect all changes in expected economic factors (Harvy,1989:38). These factor contains the interest rates, producer price index, money supply growth inflation, gross domestic product (GDP),and so on⁽¹⁾.(Harrison et al,2000:8-10)

There is widespread agreement that the stock market contains important information about real economic activity .The association between stock market and real activity originates with the fundamental valuation of equity:- (Brealey et al,2006:64)

$$\text{Stock price} = p_0 = \sum_{j=1}^{\infty} \frac{\text{expected dividends}}{(1+r)^j}$$

Where r is the rate at which dividends are discounted .It is usually assumed that r is constant⁽²⁾.

Recession, for example, means lower earnings and dividends for most equities. If investors make a downward revision in their forecast of a firm's dividends because they expect a recession ,stock price, according to the above equation, will drop. Of course, a change in equity valuation could also be caused by a change in the discount rate. This may confound the information about real growth contained in stock prices ,therefore ,their cash payments .

- (1) Sometimes a seemingly non economic or non financial events such as the Iraqi invasion of Kuwait will affect these fundamental forces. When Saddam Hussein's army (I am one of them) invaded Kuwait in 1990, oil prices shot up while bond and stock prices fell dramatically .This drop continued for several weeks as it became more apparent each day that Iraqi troops were not going to be dislodged from Kuwait quickly or easily.



- (2) We are at odds with this assumption because, it is unlikely that this discount rate is constant. It will change as the marginal rate of substitution changes and as the riskiness of cash flows changed through time, therefore, it is important to note that the market price will continue to grow at rate g forever .

To examine the degree of response of stock prices in the market to local economic factor as a method to measure the market effectiveness ,the algebraic representation of a multifactor model ,that is, a factor model with more than one element ,is given in equation below:- (Grinblatt and Titman,1998:201)

$$r = \alpha_i + \beta_{i1}F_1 + \beta_{i2}F_2 + \dots + \beta_{ik} F_K + e_i$$

where :

α_i = the regression's intercept.

β_i = the regression's slope coefficient to the factor_{1-K}.

Factor_{1-K} = common factors.

e_i = stock i regression residual or error term.

Table 1-B present dependent and independent variables :-

Table 1-B
The Model variables

Depen. Var. →	Average price per share(p)	Number of stock traded (NS)	Total volume Traded (TVT)
Indepen. Var. →	Inflation Rate (INFR)	Real Money Supply(RMS)	Real Gross national product(RENP)

Here, we can use (r) for any depend variable such as the price of stocks, number of stocks traded, total volume traded and so on. The assumption behind above equation is that securities prices or returns are generated by a relatively small number of common factors ,each factor symbolized by a subscripted F, for which different stocks have different sensitives or β 's⁽¹⁾, along with uncorrelated firm-specific components⁽²⁾, the e_i denote to an error term and in effect contribute negligible variance in a well- diversified portfolios.

- (1) Indeed, the slop coefficient of a regression line is defined or (called) a beta coefficient ,while ,in the financial literaries beta measures stock's volatility or (sensitivity) to market or economic fluctuations .
- (2) Also ,named Firms –specific risk that part of a securities risk associated with random outcomes generated by events ,or behaviors , specific to the firm (or the sector) ,for more detailed , see (Weston et al ,1996:201)

6- Empirical Results and discussion:



4-1 Summary statistics

Table 2 presents summary statistics or self-attributes for the Iraqi stock exchange (ISE's). The first column reports the market capitalization which represent the overall size of ISE, the higher size (Q4-2005) reflect a higher level of market capitalization, whereby the lowest size (Q3-2004) represents the lower size of market capitalization .

The second column of table 2 shows the number of companies that are listed on the market, this number range from (51) company in Q3-2004 to (94) in Q1-2008 ,as well as their listed companies, column 3 presents the traded companies on the market in the same period.

Column 4 details a number of traded shares during the cross-sectional period. The column shows that the Q3-2007 witnessed a remarkable surge of the number of traded shares (86702) and this level of traded shares are reflected in the trading volume(column 5) because the Quarterly Trading volume represents the average dinnar value of shares traded, relative to the size of the market .

The last columns of table 2 give the turnover ratio of the ISE, this ratio is calculated in dinnar terms by dividing total value traded by average market capitalization.

Table 2
Trading indictors of ISE :July 2004-March 2008

	1	2	3	4	5	6
Year	Mkt. Cap. (m.ID)	No. of listed co.	No. of traded co.	No. of traded shares (M.S)	Trading vol.(M.ID)	Turnover ratio %
2004						
Q3	4962747	51	36	9511	88350	1.8
Q4	4989048	75	44	4311	35994	0.07
2005						
Q1	6123415	85	48	12944	47552	0.08
Q2	6986311	89	59	17532	118044	1.7
Q3	6444786	85	52	10240	58224	0.09
Q4	9551541	85	47	14950	113118	1.1
2006						
Q1	8560286	93	53	10858	61297	0.07
Q2	7261939	93	52	14700	41656	0.05
Q3	6051287	90	42	11100	19768	0.03
Q4	5759917	92	43	13919	24171	0.05
2007						
Q1	5812439	94	46	11189	21143	0.04
Q2	5507803	93	53	16637	24988	0.04
Q3	5066996	93	54	86702	284853	0.5
Q4	6376957	94	50	34463	96113	0.2
2008						
Q1	6741393	94	59	43270	92271	0.1

Source :Author's calculations



4-2 Efficiency of Iraqi stock exchange .

To test the first hypothesis of whether Iraqi stock exchange fully reflect all available, relevant information, Fama's efficient market hypothesis will be utilized to test for the weak form of the hypothesis by looking at current stock prices and testing if they show any systematic dependency or interdependency with successive levels.

The autocorrelation function provides us with a measure of how much correlation there is and by implication how much interdependence there is between neighboring data points in any series, we have examined all four sectors of a time series. An estimate of the autocorrelation function, which is usually called the sample autocorrelation, say for series P_j , can be found by: (Harvey,1995:24)

$$r_k = \frac{\sum_{t=1}^{T-K} (P_{jt} - P_j)(P_{jt-K} - P_j)}{\sum_{t=1}^T (P_{jt} - P_j)^2}$$

Where K is the number of lags, p_{jt} the price of stock j in a time t .

Estimates of such relation for stock prices are presented in table (3). Among the four sectors of the market, only 2 lags have first-order autocorrelation with significant level (banking), 1 lag have second-order autocorrelation in ΔP_j (services), and one lag have nine-order autocorrelation (Toursim). It is obvious from the estimates of the sample autocorrelation that a very low correlation among the quarters for both P_j , ΔP_j . considering these evidences the non-existence of along lag dependency suggests:-

- 1- That the stock price series for all traded in ISE follows the random (or stochastic) process with generated the data is invariant to time, so the evidence suggests that prices can't be predicated on the basis of past information.
- 2- Low coefficient of correlations and low the standard of the autocorrelation (not reported, range from 0.09 to 0.26) suggests that the H_1 hypotheses can be rejected.



Table (3) Auto correlation coefficients of stock prices for stock traded in ISE 2004:7 2008:3

sectors		1	2	3	4	5	6	7	8	9	10	11	12
Banking	P_j	.535*	.072	-.394	-.379	-.241	-.148	-.088	-.102	.043	.033	.086	.053
	ΔP_j	.501*	-.300	-.437	.146	-.083	-.035	-.009	-.131	-.001	-.243	-.051	.045
Services	P_j	.494	-.163	-.391	-.331	-.163	-.082	-.033	.036	.079	.018	.011	.023
	ΔP_j	.538	-.638*	-.004	-.223	-.061	-.244	-.051	-.120	-.065	-.217	.059	-.192
Industrial	P_j	.406	.111	.119	.088	-.305	-.205	-.247	-.282	-.175	-.051	-.027	.021
	ΔP_j	.064	-.064	.118	.000	-.418	.112	-.292	-.054	.108	-.199	.181	-.167
Tourism	P_j	.079	.029	.215	.125	-.214	-.240	-.044	-.102	-.355*	.025	-.041	.017
	ΔP_j	.031	.022	.213	.079	-.250	-.294	-.069	.022	-.203	.079	-.107	.088
The market	P_j	.807*	.701	.203	.231	-.052	-.135	-.242	-.310	-.421	-.412	-.437*	-.351
	ΔP_j	.672*	.299	.108	-.042	-.164	-.229	-.111	-.199	-.231	-.125	-.068	-.201

Note: values are based on Iraqi dinnar from quarterly date, p_j denote the j th-order autocorrelation coefficient or the prices, ΔP_j denote the j th-order autocorrelation coefficient to the rate of change in prices .

*significant level 5%.

4-3 Effectiveness of the ISE

In this section an attempt to test how effective ISE is in reflecting the economic fluctuations in the Iraqi economy will be made .Three ISE measures will be used ; the average price per stock (p) , the number of stocks traded (NS), and total volume traded (TV). One functional form, which specify the relationship between these ISE measures and some of the market aggregates, will be estimated. The form relates each of those measures to growth rates of real money supply (RMS), to real gross national product (RGNP), and to inflation rates (INFR). The regression equation we are trying to estimates is: (Levin and Rubin,1998:728)

$$Y^{\wedge} = a + b_1x_1 + b_2x_2 + \dots + b_kx_k \quad \text{where :-}$$

Y^{\wedge} = estimated value corresponding to the dependent variables (in this study P, NS and TV .) $x_1 \dots x_k$ = values of the indendent variables (in this study $INFR, RMS$, and $(RGNP)$).

$b_1 \dots b_k$ = slopes associated with x_1 to x_3 , respectively .

Table (4,a,b,c) represent the estimates of above equation . The following observation are evident from the tables :-

- 1- Inflation rates has the expected significant effect on prices , number and total volume of stock traded in ISE, the positive and significant estimates suggests that the ISE measures in general, seem to be dependent or affected by the inflation corresponding with consumer price index (CPI) and these result indicate that P, N and TV of stocks move in the same direction with the inflation index in all sectors. That is, higher rate of (CPI) will be associated with higher stock prices, and thus, higher total volume of stocks.



- 2- The growth rates of real money supply (RMS) are , in general, has positive and significant estimates on stock prices except in the industrial sector but not with more general indices ,such as a number and total volume of stocks.
- 3- The real gross national product seem to be insignificant in affecting and explaining the behavior of stock prices, their number and their trading volume.
- 4- Although the addition of three factors increase the ability to explanation the relationships among the dependent and independent variables , in most regression the coefficient of determination R^2 is quite low . such a result may suggest that there exist a very weak relationship between major ISE measures and main real economic indicators so the H_1 hypothesis can be rejected at the 5 percent level.

**Table 4-a
Dependent variables :Price per stock (p)**

Sectors	A (constant)	INFR ⁽¹⁾	RMS	RGNP	R ²	DW
Banks	7.22	1.15 (1.47)*	3.41 (1.60)*	.40 (0.09)	.31	1.95
Services	23.4	6.38 (3.35)*	1.25 (1.85)*	-2.90 (0.56)	.22	1.08
Industrial	12.6	1.82 (0.28)	1.70 (1.40)	-1.52 (0.23)	.19	1.53
Tourism	28.6	3.13 (1.57)*	2.43 (2.09)*	2.47 (0.50)	.31	1.95
The market	15.2	1.37 (0.76)	1.98 (1.25)	2.4 (0.24)	.27	1.54

(1) Measured by consumer price index(CPI)

* significant at level 5%

Table 4-b

Dependent variables :Number of stock(N)

Sectors	a (constant)	INFR	RMS	RGNP	R ²	DW
Banks	13.06	6.38 (3.35)*	-2.74 (-1.67)	.64 (.09)	.27	1.86
Services	11.40	1.09 (0.34)	1.399 (.162)	1.57 (.97)	.29	1.56
Industrial	9.01	1.92 (1.25)	1.677 (.78)	3.215 (2.107)	.11	1.93
Tourism	33.4	3.25 (1.83)*	-1.071 (-0.75)	-1.35 (.82)	.20	1.48
The market	13	3.93 (2.73)	-2.99 (-0.42)	1.03 (3.80)	.26	1.61



Dependent variables :Total volume of stock (TV)

Sectors	a (constant)	INFR	RMS	RGNP	R ²	DW
Banks	13.	11.18 (1.47)*	-.07 (.18)	-2.21 (.29)	.304	1.04
Services	8	3.22 (0.52)*	-.100 (-2.2)	.016 (1.00)	.09	1.62
Industrial	12	1.23 (.739)	.695 (5.162)	.829 (7.86)	.02	2.00
Tourism	9	1.17 (4.8)	.032 (2.50)	.900 (4.88)	.13	1.27
The market	11	1.032 (12.16)	-3.77 (1.13)	1.56 (1.49)	.18	1.90

5- Conclusion and Recommendations

5-1 Conclusions

Much research has documented the efficiency and effectiveness of stock markets. However, little is known about ISE at least up until now. The efficiency test is conducted through the weak form of Fama's efficient market hypothesis which is based on testing the interdependency of stock prices through sample autocorrelation. The paper concluded that no lag dependency among stock price existed. Also, the effectiveness test of ISE was conducted through relating certain ISE is relatively independent of the economy.

5-2 Recommendations.

- 1-The function of an efficient stock market is to provide and process information and thereby guide capital towards its best economic use, so, there are an important need to improve the efficiency of ISE by develop monetary and fiscal transparency in a clear and timely manners, in accordance with international standards.
- 2-Building on previous figger, we be need to enhance the stock exchange listing requirement for public companies with respect to frequency of financial reporting.
- 3-In order to provide a healthy investment environment in ISE, the investors should be provided with all needed information.
- 4- An aggregate index of ISE activities should be published such as, an industrial production index, or any other index which reflect the state of the market.
- 5- The government should be participates in ISE by offering government bonds in order to borrow money from financial institution.



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